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ANALYSIS OF FACTORS INFLUENCING
SELECTION OF RESEARCH TOPICS IN THE
KANSAS STATE AGRICULTURAL EXPERIMENT STATION

by

KAREN SCHWARTZ

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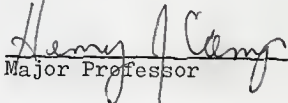
Department of Sociology, Anthropology, and Social Work

KANSAS STATE UNIVERSITY

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Approved by:


Major Professor

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Chapter 1

INTRODUCTION

In spite of the ability of modern U.S. agriculture to produce a surplus of food, problems in the area of food production are numerous. The land grant system is an institution that was created to help those involved in agriculture solve problems. In examining the ability of this institution to fulfill its role, it is important to know who is served and the manner they are served. In determining that ability, various facets of the system can be examined, as the college is involved in teaching, research and extension. This study is mainly concerned with research in agricultural experiment stations, as new agriculturally related information in land grant colleges is basically developed within this segment.

A wide variety of interests are involved in agricultural research. Required information is diverse in order to fill the needs of agribusiness, large farmers, small and organic farmers, farmworkers, small town residents, and consumers. Experiment stations, possessing limited resources (funds, time, and personnel), may not be able to meet the needs of all groups. If not, who is the prime beneficiary of research conducted by the land grant university? Further, what are the factors influencing the selection of research topics? What pressures do experiment stations face from outside the university and to what extent do pressures

determine the selection of research?

By examining these questions, an analysis of the Kansas State Agricultural Experiment Station and the factors influencing selection of research topics is made. The following issues are included:

(a) the historical background of the land grant system, specifically the identification of prime beneficiaries;

(b) how researchers perceive their role within the experiment station and the extent to which researchers perceive that they are allowed to select research topics they will conduct; and

(c) the pressures that agricultural experiment stations face from both funding groups and critics; an analysis of strategies used by experiment stations in coping with these pressures; and finally, the extent to which pressures facing experiment stations influence the type of research conducted. Potential pressure groups include state and federal legislatures, farm organizations, agribusiness, farmers, consumers, and various critics.

Organizational Perspective

The open systems theory is an attempt to understand the survival and maintenance of an organization. This perspective is useful in the examination of agricultural experiment stations as part of the land grant system, because it emphasizes the interaction between an organization and its environment. As agricultural experiment stations cannot

be understood by analyzing only one segment of their structure in isolation, the following elements are considered: (a) the historical situation from which agricultural experiment stations arose and the development of the population they serve; (b) how agricultural experiment stations, as social organizations, are renewed by resources such as funding and affected by pressures/feedback from the environment; and (c) researchers' perception of their role in an experiment station, and how that perception has been affected by the historical background of experiment stations and the pressures/feedback from the environment. Before analyzing these elements, it is necessary to look at an overview of open systems theory in relation to agricultural experiment stations.

Open systems theory and its relation to agricultural experiment stations. The open systems perspective was first developed by von Bertalanffy (1956) as an explanation for the structure of systems in the natural sciences. Katz and Kahn (1970) and Buckley (1967) found that the concepts of open systems theory applied to social organizations as well as biological. Katz and Kahn (1970:150) defined a social system, including organizations, as a pattern of activity conducted by a number of individuals. Those activities are repeated in a cycle and have complementary outcome or output.

Prior to the development of the open systems theory, a system was viewed as a closed or relatively self-contained structure which could be examined in isolation from external

forces. That model was common in the physical sciences. In contrast, an open system was defined as ". . . an energetic input-output system in which the energetic return from the output reactivates the system" (Katz and Kahn, 1970:150).

Social organizations can be viewed as open systems, since the cycle of energy input-output involves the interaction between the organization and its environment. Further, Buckley stated:

That a system is open means, not simply that it engages in interchanges with the environment, but that this interchange is an essential factor underlying the system's viability, its reproductive ability or continuity, or its ability to change (Buckley, 1967:50).

The outside environment of agricultural experiment stations includes farmers, consumers, industry, agribusiness, the state legislature, the Federal government, pressure and interest groups, funding agencies, and critics of the land grant system. These groups are part of the political and economic forces that affect the land grant system. The Industrial Revolution and the Populist Movement during the late 1800's are examples of dramatic shifts in the forces that shaped the direction of land grant colleges.

The internal environment of agricultural experiment stations includes researchers and administrators. Although not part of the experiment station, extension workers and agriculture professors play an important role in the land grant system of disseminating research results and providing education.

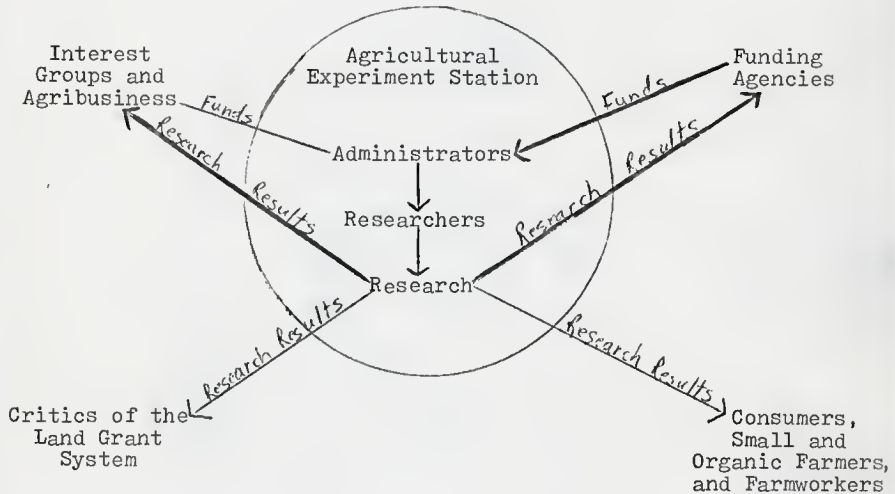
Agricultural experiment stations as open systems are

composed of a cycle of organization-environment interaction. Funds and personnel are administered to an experiment station from outside groups. With these resources new products, techniques, or information are developed and sent to the outside environment to farmers, consumers, industries, or other groups. The Extension Service as part of the land grant system is a facility for the distribution of experimental results, although research results are also released by the researcher to outside groups and individuals. The flow of funds, through the experiment station to the researcher for his/her research projects, and the distribution of research results to the external environment is diagrammed in Figure 1.¹

An experiment station must continually bring in funds and other necessary resources from the outside environment for the continued operation of the organization. Positive and negative feedback are also received from outside groups, individuals, and the legislature. Those responses can provide information as to whether the experiment station is fulfilling its goals. That feedback can also be used in setting research priorities. The structure of an organization is influenced by the organization-environment interaction over time. According to Wolin (1969:133), "an organization . . . represents a complex response to a particular historical event."

¹The Extension Service is not included in Figure 1 as my study dealt mainly with the Kansas State Agricultural Experiment Station.

FIGURE 1
Flow of Funds² Into and Research
Out of Agricultural Experiment Stations



—————> Major Flow of Resources and Research Results

—————> Minor Flow of Resources and Research Results

²According to Dr. Leland (June, 1978), all funds for research in the Kansas State Agricultural Experiment Station come through the Experiment Station Director's office. If an individual researcher applied for and received a grant, the funds come through the Experiment Station with that researcher designated as the principal investigator. If the grant is over \$5,000, a percentage of the funds is charged for overhead expenses (lights, equipment, etc.). Dr. Leland is the Assistant Director of the Kansas State Agricultural Experiment Station.

Since the mid 1800's, political and economic factors have shaped the development of land grant universities. In describing how agricultural experiment stations as part of the land grant system developed, I discuss the factors leading to the adoption of land grant legislation; agrarianism and how agricultural colleges were influenced by and served agrarians; the influence of the Industrial Revolution and capitalism on the land grant system; and the linkages between the Farm Bureau, commodity organizations, and land grant universities. To understand how decisions on the selection of research topics are made, the following are also examined: the influence of funding agencies on project topics; the effects that pressure from critics have on the land grant system and research that is conducted in the universities; and, the socialization of researchers into the land grant system.

Development of the Land Grant System

Knowledge of agricultural experiment stations as part of the land grant system requires knowledge of the unique historical situation from which the land grant system arose. As the open systems model explains, an organization does not exist in isolation from its outside environment. Understanding the interaction over time between the land grant system and its outside environment provides insight into the adaptation of this organization to external forces. Therefore, the following section examines the factors leading to the enactment of land grant legislation; the influence of radical

agrarians and conservative agriculturalists on the land grant system; the response of land grant universities to the Industrial Revolution; and the linkages between the Farm Bureau and marketing orders on the land grant system.

Factors leading to land grant legislation. Prior to the development of land grant colleges in 1862, advanced education was limited primarily to the professional and upper classes. The desire to provide an education for farmers and the working classes was among the factors leading to the adoption of land grant legislation. Another factor was an increasing industrialization in the United States in the last half of the nineteenth century, which encouraged an interest in science and a practical education. According to McCain, land grant colleges were designed for relevance and provided society with desired practical knowledge and skills (in Carey, 1977:23). The democratization of knowledge was the ideal behind initial land grant legislation (Breimyer, 1978).

In 1850, Johnathan Baldwin Turner proposed the founding of state universities for the agricultural and industrial classes. Turner claimed that the universities of his time served only the professional classes and that society had not yet realized the need for workers as well as professionals to be educated (Carey, 1977:19).

In 1857, Justin Morrill introduced a bill into Congress with the purpose of making public land available for agricultural and mechanical colleges. Morrill argued that by educating farmers the fertility of the soil would be

better preserved. There were schools for those engaged in war and aid from the federal government for those in manufacturing and transportation. Therefore, Morrill felt there should be special schools for farmers, mechanics, and industrial workers "to teach men the way to feed, clothe, and enlighten the great brotherhood of man" (Morrill in Cary, 1977:23).

Carey (1977:21) noted that while Turner and Morrill were advocates of education for the common man, farmers and laborers in the 1850's were not demanding a university. The heavily classical curriculum of the universities then in existence encouraged an attitude of anti-intellectualism among many farmers and laborers. In a move away from the emphasis on classical studies, students and citizens, in the 1850's, expressed an increasing interest in studies that had a practical application. At that time, science was developing in the United States and Europe. The desire for labor saving devices to help develop the vast U.S. lands added to the growing interest in a practical education. In the 1850's, the United States was still predominantly an agrarian nation (Robert Smith, 1972:112). To establish an industrial nation, a large proportion of the labor force needed to be released from farming. Rudolph explained that

As an expanding dynamic industrial society set about making itself into a colossus of power, new institutions would be developed that would better meet the requirements of such a society (in Carey, 1977:22).

The creation of the land grant colleges was an attempt

to prepare farmers and industrial workers to meet the challenges of the Industrial Revolution. In 1862, President Lincoln signed the Morrill Act which donated public lands in each state for the support of colleges of agriculture and mechanics (12 Stat. 503). The United States Department of Agriculture (USDA) was created in 1862 (12 Stat. 387). Research and experimental work were sponsored by the USDA and included both research relating to production and marketing of agricultural goods and to rural communities in general. The state agricultural experiment stations were established by the Hatch Act of 1887, with research their main function. The Morrill Act of 1890 established the black colleges of agriculture in the South (26 Stat.). The Smith-Lever Act of 1914 established the Extension Service as a means of disseminating research to all people. Those new universities were unique in that they provided off-campus education and promoted economic development.

Agrarianism and the land grant system. The land grant system was developing at a time when a farmers protest movement was gaining strength. From the late 1860's to the end of the century, large and small farmers began to join together for a time (Dowd, 1974:156). It was then, according to Soth (1970: 663-664) that agrarianism, which he defined as "a symptom of the industrial revolution," began.³ Radical agrarianism

³Agrarianism has been defined differently by various authors. There is general consensus, however, that the time of the industrial revolution was marked by protest activities of farmers. For more complete reading on agrarianism see Rohrer and Douglas (1969), Taylor (1953), and Pollack (1962).

involved protest activities of oppressed farmers troubled with high costs and low prices. A dichotomy of political interests arose between farmers and manufacturers, railroads, and nonagricultural businesses. Farmers began to realize that their economic livelihood relied not only on their skill as farmers, but also on the market economy, the banks, railroads, wholesaling, and manufacturing. Radical agrarians joined political organizations to fight for their interests (Soth, 1970:663). Among the organizations were left-wing protest movements such as those by the Populists, early Grangers, and the Greenbackers that represented not only farmers, but also industrial workers. Radical agrarians sought to improve the economic condition of farmers and workers through political changes. For instance, many radicals opposed the high tariff policies of manufacturing interests and advocated cheap money to counteract low prices for agricultural goods and high costs of production. Cheap money would help farmers and workers pay off their debts more readily.

Farmers, laborers, and rural people in general shared an interest in fighting the railroad, industrial trusts, and the banks (Soth, 1970:664; Dowd, 1974:156). Yet, as farm prices rose toward the end of the nineteenth century, the influence of the radical agrarian lessened and conservative agrarianism became strong. The conservative agrarians or agriculturalists pursued economic improvements through technology. They considered the land grant system as a means

to improve their technology through education and research. With mechanization and more efficient farming practices, low prices for agriculturally related products could be offset. The land grant colleges encouraged farmers to use rational business procedures such as farm management practices (Rohrer and Douglas, 1969:39).

The influence of populism on a land grant institution.

The land grant system is affected by the external social and economic environment. Thus, changes in the outside environment may change the structure or functioning of the organization. In the 1880's and 1890's, the Populist Movement, an expression of radical agrarianism, was growing. According to Pollack (1962:11-12), the Populists "accepted industrialism but opposed its capitalistic form, seeking instead a more equitable distribution of wealth."

Kansas State University is a case where the Populist Movement at least for a brief time affected the philosophy of a land grant college. In 1892, the Populists who were joined by Democrats took control of the state house in Topeka. In 1897, a Populist governor was elected, and the Board of Regents included five Populists and two Republicans. While Thomas Will, president elect of the College,⁴ declared himself

⁴In 1863, Bluemont Central College in Manhattan, Kansas, became Kansas State Agricultural College. In 1931, the name was changed to Kansas State College of Agriculture and Applied Science, and in 1959, this institution became Kansas State University.

independent of any party, he advocated public ownership of utilities and bimetalism.⁵

Throughout the country, Populists along with some Democrats were stressing the need for government reform, while Republicans hoped to maintain the status quo. Populists were critical of the Republicans' belief that if you possess a great degree of wealth you deserve it. According to Carey,

The anti-Populists were fearful that the reformers would turn the world upside down, let free and unlimited coinage of silver wreck the gold standard, and set the have-nots against the haves in a bitter struggle (Carey, 1977: 77).

The conflict between the Populists and Republicans continued in Manhattan and throughout much of the state. Newspapers across the state discussed issues associated with Populism and the pros and cons of President Will's administration. Occasionally, Will used the Manhattan Industrialist, a local newspaper, to reflect on Populist views of social issues, especially the problems individuals faced as a result of the Industrial Revolution.

President Will stated that the Agricultural College had the goal of teaching farmers how to farm and also how to receive their share for what they raised. With this goal in mind, the coursework in economics at K-State was increased so that students would begin to understand how someone could

⁵Bimetalism is the doctrine advocating the "use of gold and silver as the monetary standard of currency and value" (The American Heritage Dictionary of the English Language, 1969:132).

work hard, skillfully, and be productive, yet remain poor in a rich country (Carey, 1977:76). The purpose of economics was to further explain how conditions could be improved. Critics, however, claimed that the College was moving away from agriculture toward the "hazy realm of economics" (Carey, 1977:77).

In 1899, when the Republicans again gained control of the state government, President Will and his allies at the College were removed. It is difficult to assess the influence of the Populists on the philosophy of the Kansas State Agricultural College. Yet, for a time the College emphasized not only how to be a productive farmer or laborer, but also the importance of understanding the political and economic conditions affecting the worker.

While the Populists in Kansas influenced the Kansas State Agricultural College for a time, the land grant system in general seemed better suited to meet the needs of the conservative agriculturalists as the conservatives sought improvements through technology. According to Hadwiger,

The common farmers were never great champions of education and research to begin with, and the great farmers mass movements of the nineteenth century seemed largely to have ignored agricultural education (Hadwiger, 1975: 37).

The land grant system's conceptualization of agricultural efficiency played a major role in determining who the universities served. The development of a philosophy of agricultural efficiency by the land grant system and the effects of that philosophy are discussed next.

Agricultural efficiency. Throughout the history of the land grant system, efficiency in agricultural production has been stressed. The real issue is not that efficiency has been a goal, but how efficiency has been defined and used. The definition used by the land grant system influenced the development of agriculture and the type of research that was and is being conducted. Efficiency can be defined in terms of: (1) least cost per unit, (2) direct use of labor, (3) indirect use of labor, and (4) energy use.

One of the most frequent ways of defining efficiency is in terms of least cost per unit. Many authors such as Madden, Aines, Partenheimer, and Sundquist (1972) spoke of efficiency of farms merely in terms of volume of production and economic gain. Others, such as Former Secretary of Agriculture, Clifford Hardin, reflected the idea that agriculture is efficient in terms of output per man hour as labor saving devices have freed people from the task of farming (Perelman, 1976:65). Only the labor directly involved in agricultural production is considered in this view.

Whereas the latter view considers the labor directly involved in agricultural production, another view recognizes the indirect labor necessary especially in mechanized production. Perelman (1972:8-10) described that aspect of efficiency by taking into account all of the workers and the labor related to agricultural production. Thus, a man cannot feed 75,000 chickens by himself. He is assisted by people who make machinery and all of the so-called "necessities" for

running a "modern farm." The late 1940's could be considered a transition period from a limited use of machinery and chemicals to one of increasingly greater use of those products.

Finally, efficiency can be described in terms of energy use rather than production or labor. Allaby and Allen (1974:27) saw much of the farming in the 1970's appearing to be much more efficient than it really is through large inputs of energy and minerals. This situation is apparent in the energy crisis in the United States and European countries. Therefore, Allaby and Allen described efficiency in terms of energy, explaining that when one compares farming systems in terms of input of energy in relation to output, efficiency gains a new meaning. Energy use is raised by attempts to increase yields per acre through greater use of fertilizer, by the use of farm machinery, and by the amount of processing, pre-cooking, and packaging. Thus, highly mechanized agriculture is less efficient, if defined in terms of energy output (food) in relation to energy input (Allaby and Allen, 1974:27). Pimental et al. (1973:448) also noted that as agriculture is dependent upon nonrenewable fossil energy, crop production costs will also soar when fuel costs increase two-to-fivefold.⁶

In summary, efficiency can be based on the criteria

⁶For further reading on agricultural efficiency, see League of Women Voter's (1974), Catherine Lerza (1975), Michael Perelman (1972), and Michael Perelman and Kevin Shea (1972).

of least cost per unit, labor, or energy use. A specific type of production may be efficient in terms of one or more of these criteria and inefficient according to the others. The definition that is used by the land grant system and by those outside of it, such as large farmers and agribusiness, will influence the research that is conducted in agricultural experiment stations. For the most part, throughout the history of the land grant system efficiency has meant increasing maximization of profit through least cost per unit and volume of production rather than in terms of indirect labor or energy use. In order for the Industrial Revolution to occur, it was necessary to free labor from farming to engage in industrial activities. Therefore, the meaning of agricultural efficiency did not include the amount of indirect labor involved in agricultural production. Further, in the 1800's and early 1900's, the resources of the United States seemed unlimited and few people realized the amount of energy the use of chemicals and mechanization would eventually consume to make agriculture "efficient." The factors influencing the land grant system's conceptualization of agricultural efficiency and the effects of that conceptualization are explored in the next passage.

Emphasis on productivity and technology. According to Dowd (1974:156), the years after the Civil War until the end of the nineteenth century were marked by increasing worldwide industrialization and improvements in technology, transportation, and communications along with

national/international trade and competition. Prices of agricultural products were falling while production was rising. "Survival of the fittest" was the dominant ideology explaining societal trends. In agriculture, the "fittest" were those who could enlarge their lands, improve their technology, and market their products most efficiently. It was an individualistic, competitive ideology. As the forces of industrialization were changing nineteenth century America, the developing land grant system was also changing. Thus, the land grant system emphasized research that could help farmers enlarge their lands, improve their technology through increasing mechanization, and efficiently market their products.

According to Friedland and Barton (1976:42), the land grant university during and after the 1860's was concerned about the effects of increased urbanization on the rural community and the problems of increased agricultural production to sustain the urban population. Yet, as Friedland and Barton explained,

At the very early stages these institutions, as they were created by Congress and institutionalized in a federal bureaucracy, learned to deal with the most effective and efficient farmers, with the local centers of power and authority and influence, and to accommodate local power interests. Thus, it is no surprise that agricultural institutions came to cater to the most entrenched interests and expressed little concern for smaller farmers, marginal farmers, black farmers, and the Okies and Arkies (during the dust bowl days). With the criterion of efficiency established in capitalist production relationships as their major concern, there was little time or effort left for preserving the rural community (Friedland and Barton, 1976:42).

In the United States, the dominant economic system

of capitalism affects many organizations including the land grant system. According to Dowd (1974:164), capitalism furthered the land grant system's emphasis on agricultural productivity in the following way. The land-grant universities all have had Colleges of Agriculture and Departments of Agricultural Economics. Overall, the methodology of the latter is similar to that of economics in general; its purpose is to show how efficiency and profits can be maximized. Another element the two areas have in common is what E.J. Mishan termed "growthmania." They respond, aware of it or not, to the need in a capitalist economy for continual expansion. Mishan explained that among those entrenched with that idea

any doubt that, say, a four percent growth rate, as revealed by the (economic) index, is better for the nation than a three percent growth rate is near-heresy; is tantamount to a doubt that four is greater than three (Mishan, 1969:xv).

Throughout the history of the land grant system but particularly after 1930, the intense emphasis in agricultural research on productivity and new technology stimulated a loss of the somewhat "homogeneous farm political economy." According to Soth (1970:665), the agricultural industrial revolution produced this fission in three ways. First of all, the industrial revolution in agriculture accelerated the rural-to-urban movement of people. It accomplished that movement by enlarging farms and reducing farm labor requirements through increasing mechanization especially after World War II.

Second, the transformation to large-farm businesses,

although still family farms in the sense that they were operated by one family, caused many farm families who were unable to compete to look elsewhere for employment. Those pushed out of agriculture had few resources of land or capital and a low level of education and agricultural productivity. According to Boulding, as the land grant system was effective in improving production efficiency, a steadily declining farm population was the result (in Rohrer and Douglas, 1969: 72). It was as though the land grant system was working farmers out of a job.⁷

Finally, farms became much more specialized throughout the twentieth century and particularly in the 1970's. There are more grain farms, poultry production businesses, and cattle feeding enterprises, where previously farms were more diversified. Thus, a wide ranging set of political interests was created. Farmers could no longer be viewed as a coherent political force, but were split into specialized commodity pressure groups.

In summary, the Industrial Revolution and capitalism were changing many aspects of American agriculture in the last half of the nineteenth and the twentieth century. The land grant system did not cause the Industrial Revolution or the mechanization of agriculture, yet the influence of the

⁷In 1880, 44 percent of the American people were members of the farm population. In 1935, with about 7 million farms, a peak was reached in the actual number of farmers while the proportional decline had begun in the early 1900's. In 1976, it was estimated that there were 2.8 million farms (Bureau of the Census, 1970:457, 459; USDA, 1977:423).

land grant universities facilitated the trend towards mechanized agricultural production. As the land grant universities developed, they became more powerful with the help of other organizations. The next section discusses the Farm Bureau and state agricultural commodity interests, two of the organizations instrumental in the development of the land grant system.

Growth to power. As Katz and Kahn (1970) and Buckley (1967) explained, outside groups can influence the internal functioning of an organization. Two organizations that have helped shape agricultural policy and influence the land grant system are the Farm Bureau and state commodity organizations through marketing orders.

During the last half of the nineteenth century, the land-grant colleges and state agricultural commodity organizations⁸ formed a coalition that grew and became powerful while emphasizing technology and more efficient production (least cost per unit). The farmer was seen as a businessman (Soth, 1970:664; Boulding in Rohrer and Douglas, 1969:72). Because of the emphasis on technology, the land grant colleges and state commodity organizations stood behind the interests of the conservative agriculturalists who sought improvements through technology rather than behind the radical agrarians

⁸A state commodity organization is a state based group of producers and processors of a farm product such as wheat, sugar, or cotton. These organizations often act as a liaison between the individual farmer or processor and policymakers (Hadwiger, 1975:37; Rohrer and Douglas, 1969:63).

such as the Populists who sought changes through political means (Soth, 1970; Dowd, 1974; Rohrer and Douglas, 1969).

After the turn of the century farmers joined national political movements only intermittently (Dowd, 1974:161-162). Their greatest influence then was through pressure groups involved in a particular commodity. During the 1920's, the farmer as a pressure group showed evidence of effectiveness, apparent in the growing cooperation between large farms, the government, and agricultural colleges and the increase in agricultural industrialization.

During and after World War I, the land grant colleges became more powerful when they organized statewide systems with county agents and county bureaus of farmer cooperators. Those bureaus were funded with state, local, private, and federal funds. Hadwiger (1975:37) explained that the function of the county agent was "to 'extend' college research findings to local groups of innovative farmers in farm bureaus, usually organized by the agent himself." In 1919, the state and national organizations became the American Farm Bureau Federation. As Soth (1970:664) explained, "The Farm-Bureau-land-grant college complex became a strong political machine in most of the rural states."

After 1919, the Farm Bureau formed a national lobby and influenced the development of strategies which gave producers control of land grant research policy and agricultural policy in general (Hadwiger, 1975:37). The first strategy was solicitation of farmer electoral support in

Presidential and two-party congressional elections. Another strategy involved giving rural power groups control over state and local branches of federally subsidized organizations. As an example, the Farm Bureau controlled state and local extension workers.

The third strategy that gave producer's control was a coalition of commodity interests organized around congressional agricultural committees. According to Hadwiger,

This coalition, after some initial failures, enacted and reworked the price support programs under Roosevelt and Truman, and stifled efforts by those administrations to provide some benefits to rural Americans not well served by commodity interests (Hadwiger, 1975:37).

The coalition was ineffective in the 1950's due to conflict among commodity interests but was effective again during the Kennedy and Johnson administrations.

In some states commodity interests have organized around marketing orders in an attempt to keep prices stable in spite of surpluses. Fujimoto and Kopper explained that marketing orders

are grower, handler, or grower and handler supported organizations . . . formed by the majority vote of all the grower, and/or handlers of a specific commodity Marketing orders enabling legislation provide the boards with authority for research, promotion, supply control, quality control, and fair trade practices (Fujimoto and Kopper, 1975:1).

State laws governing marketing orders date back to the 1930's. According to Perelman and Shea (1972:13), "In states such as California and Florida where fruits and vegetables are grown extensively there is almost complete state management of prices and production." In California, commodity organizations

since the 1940's have relied on marketing orders rather than legislative lobbying to ensure that the research they desire is conducted by the University of California.

In analyzing California in the 1970's as an example, Fujimoto and Kopper (1975:12) found 36 state marketing orders regulating crops that grossed up to 77 percent of the state's cash receipts from agricultural production, and had significant influence on university production research efforts. Their influence results (a) from being the largest source of soft money (temporary funds that may be allocated for research personnel and equipment) to the agricultural experiment stations; (b) their extensive communication network with agricultural scientists; and (c) through decisions by the university to initiate, facilitate, and govern marketing orders. When commodity interests of various marketing orders conflict, marketing orders exert influence on the university in different directions. As usual, consumer groups, small farmers, farmworkers, workers cooperatives, labor unions, and organic gardeners and farmers are omitted (Fujimoto and Kopper, 1975:12).

Summary

In summary, the land grant system developed with an emphasis on efficiency in terms of least cost per unit and maximization of profit. Several factors influenced the use of this definition by the land grant system. Technology was seen as providing increased agricultural productivity. With

increased productivity, laborers needed in the industrial sector could be released from farming, and food for the growing urban population could be provided. The land grant system viewed the farmer as a businessman, and dealt closely with the most efficient and effective farmers and with local power sources. Little attention was centered on small, marginal, or black farmers as they did not facilitate the aim of capitalistic production to maximize profit. The resultant emphasis on technology encouraged the land grant system's ties to agribusiness, commercial farmers, powerful farm organizations, and commodity interests. Those ties have also influenced the socialization of researchers as shown in the next section.

Socialization of Researchers

Throughout the history of the land grant system, researchers have held the important role in agricultural experiment stations of developing new information and products. Since its inception, the land grant system's emphasis on technology influenced its ties with outside groups. Hadwiger (n.d.) and Hightower and DeMarco (1975) viewed those ties as influencing the values of agricultural researchers within experiment stations. The values researchers hold affect their selection of research topics while the process by which they are socialized limits their freedom to make such selections.

According to Hadwiger (n.d.:1), agricultural researchers live in a subculture with its own system of rewards. Susan

DeMarco (with Jim Hightower and Susan Sechler) critically examined the researchers within the land grant system. DeMarco expected to find a conspiracy of big farmers and agribusiness that would explain why agricultural research, in her opinion, was not fulfilling its mission. She did not find a conspiracy but

a network of 'good old boys' who knew each other from 'back when,' who had journeyed together, even as they went into different institutions, and sometimes back and forth to corporations, universities, and public service (Hadwiger, n.d.:3).

Many of the agricultural scientists have similar backgrounds. They came from farming areas that were one-party Republican or Southern Democrat and remain under sponsorship of conservative politicians. They studied at land grant institutions, often getting all three degrees from the same one, or from universities in the same region of the country. As in most professions, agricultural scientists developed their own system of rewards and status. They followed a work and efficiency ethic. Agricultural research became a practical science, helping farmers increase output and raise their standard of living. John Brewster noted that when agricultural scientists had to choose between equalitarian values and individual success, they chose success oriented farmers who provided researchers with a "user" (in Hadwiger, n.d.:5).

How does being part of a subculture and coming from similar backgrounds affect the freedom researchers have in selecting research? On the surface it appears that researchers have considerable freedom in the selection of research

projects. Often researchers receive funds for projects with only a vague title or general area of research specified. In the area of research decision-making and degree of autonomy, Robinson (1971:236-237) hypothesized the levels of responsibility affecting the selection of research topics in an experiment station. He felt that research directors have little latitude in changing the proportion of research funds allotted to competing departments and, therefore, directors emphasize the growth of the institution in terms of facilities and personnel. Having slightly more flexibility than the director are department heads who mainly administer funds between competing researchers within the same department. According to Robinson (1971:236-237), the project leader has the most flexibility of the three levels of decision-making. The project leader chooses research topics from among a multitude of problems. The main constraints placed upon him/her are the amount of funds available and the question of researcher competence.

Yet, researchers are more restrained than it appears. According to Hadwiger (1975:37) researchers "have been integrated into a social and political system that has shaped their growth and functioning and determined the careers and values of the researchers." The political subsystem made up of commodity interests and powerful farm organizations, large farmers, and agribusiness has influenced past and present agricultural research and has held close ties with the land grant system (Hadwiger, 1976:37; Soth, 1970; Dowd,

1974; and Friedland and Barton, 1976). Researchers' acceptance of the values of this political subsystem stems from an adoption of an unconscious ideology⁹ and the perception that the values of this subsystem are the only natural and logical ones to hold. Thus, few researchers question the type of research groups such as large commercial farmers and agribusiness desire. Further, little pressure needs to be exerted by the administration as researchers are already conducting research that experiment station administrators see as necessary.

Based on the arguments of Hadwiger (1975;n.d.) and Bem and Bem (n.d.) concerning the socialization and freedom of researchers, the following hypothesis was formulated:

Hypothesis 1: Agricultural researchers at Kansas State University hold basically the same views as the land grant system in general and the administration of the Kansas State Agricultural Experiment Station specifically. Several ideas are related to that hypothesis.

(a) First, the majority of agricultural researchers in the Experiment Station have similar educational backgrounds and received at least one degree from a land grant institution. Hadwiger (n.d.) argued that researchers have a common educational and occupational background that influences researchers' views.

⁹The idea of an unconscious ideology is further explored in Bem and Bem's "Homogenizing the American Women: The Power of an Unconscious Ideology."

(b) Further, it is believed that the majority of the researchers in the Experiment Station select the topic of research they will conduct.

(c) Related to researchers' freedom to select topics, is the belief that researchers and administrators view the same research areas as priorities. If researchers and administrators view the same problems and research areas as necessary, researchers can be given the freedom to select their research topics while fulfilling the needs of administrators and outside funding groups.

(d) Researchers in the Experiment Station experience little pressure from the administration or outsiders to research particular topics. Little pressure needs to be exerted if researchers hold views similar to the administration and outside funding or pressure groups, as it is likely that researchers are already conducting the work these individuals and groups desire.

Pressures Faced by the Land Grant System

An organization needs the feedback process that keeps the system in tune with its environment. The land grant system receives both positive and negative feedback from outside groups, individuals, and the state and federal legislature. These responses, if absorbed by the system, will reinforce current procedures or influence changes in priorities and emphases. Only those inputs seen as valid will be absorbed. This section discusses outside pressures and counterpressures

experienced by agricultural experiment stations. Funding agencies or those with the power to influence funding agencies have the ability to exert pressure on an experiment station. Counterpressures are responses that are critical of agricultural experiment stations by farmers, consumers, or other individuals or groups. Pressures are also exerted by critics within the system, although that criticism appears to a lesser extent. Knowledge of the philosophy of the land grant system can hint at what informational inputs are seen as valid.

Sources of funding. Funding is necessary for the continued functioning of agricultural experiment stations. Funds come from various sources and influence research in different ways. Funding at an American university comes from four main sources: the state legislature, tuition, donations or grants, or the federal government.

Most state schools submit an annual budget to the state legislature and receive a sizeable proportion of their funds from that source. The state legislature has the power to exert budgetary coercion. According to Pirages and Ehrlich,

When economic times are good and when students have not been restive, the handouts have often been sizeable. When economic times have been bad, however, or when students have challenged authority, the handouts have been meager (Pirages and Ehrlich, 1974:196).

Tuition pays a portion of the cost of an institution while the federal government also provides funds. Like allocations from the state legislature, federal funds may be

subject to the discretion or moods of Washington. These monies are usually grants for mission-oriented research.¹⁰ Pirages and Ehrlich (1974:197) gave an example of the influence the federal government has over research funded by federal money. In the early seventies, Massachusetts Institute of Technology was conducting the controversial "Limits to Growth" study, which was not well accepted by Washington. A White House memo in April 1972, spoke of the disciplining of Massachusetts Institute of Technology due to the antidefense bias of the university's president, Jerome Weisner. It was suggested in the memo that nearly all federal support should be eliminated for present and near future nondefense programs (\$62 million).

A final source of funds includes donations or grants from wealthy alumni, charitable organizations, foundations, and corporations. While most of the funding is state and federal money, Hightower and DeMarco (1975:94-95) argued that corporations, private individuals, and organizations donating money will receive gains beyond the dollar value they expended. Twenty-three of the land grant colleges had tax exempt foundations that handled grants, with no obligation to publicly release the name of the contributor who may state the terms of the contract. When a grant is given by a corporation, the

¹⁰ Research is mission-oriented when there is a specific problem and research is designed to solve that problem. An example is the development of a new variety of grain sorghum that is resistant to greenbugs.

corporation may have priority in receiving a patent if applicable, while it may also receive preferential treatment when a noncorporate grant is involved (Hightower and DeMarco, 1975: 94-95; Hightower, 1972:49). Evidence for that phenomenon was also found at Cornell (Watson et al., 1972:107). Wealthy alumni may also give money with strings attached, such as the veto of any research they disapprove (Pirages and Ehrlich, 1974:196).

Funding allows the land grant system to continue to function with inputs of funds, personnel, and other resources; production of products and information in the system; and distribution of those products to the outside environment, influencing further resources. As funding is important to the functioning of an agricultural experiment station, it is hypothesized that the source, amount, and length of funding at Kansas State Agricultural Experiment Station influence the research conducted.

Hypothesis 2: It is hypothesized that private funding sources affect research in different ways than state or federal sources. More specifically:

(a) Private funding groups tend to fund projects at a lower level than state or federal projects. Hightower and DeMarco (1975) argued that private groups give minimal funds while receiving more than they invested.

(b) Private funding groups tend to fund short-term projects and state the specific topic to be researched more often than federal or state funding groups. Private funding

agencies benefit when they obtain practical results on a specific topic in a short time.

(c) Private individuals or groups donating money are given priority in receiving a patent if applicable. Hightower and DeMarco (1975) found that corporations donating money to some land grant universities received preferential treatment in getting a patent of research results.

(d) Private funding groups will pressure researchers more often than federal or state funding sources. Private groups often have a specific goal in mind and are likely to pressure researchers so that the funding group's goals are met.

Hypothesis 3: The amount and length of funds influence the amount of pressure experienced by researchers and the importance of the project to researchers and administrators in the following ways:

(a) The greater the amount of funds, the more likely the project is considered a primary area of the researcher. It is likely that when funds are high the researcher invests more of his/her time in the project. It is probable that areas of primary concern to researchers are areas of researcher expertise. Funding agencies or administrators aware of the areas in which researchers specialize would tend to fund those areas higher.

(b) Long-term projects are more likely to be considered priorities of the Experiment Station than short-term projects. Long-term projects are likely to have more resources such as money, personnel, and overhead costs invested in them than short-term projects.

(c) The greater the amount of funds, the more likely pressure is to be experienced by the researcher.

(d) Researchers conducting long-term projects experience more pressure from the administration than those conducting short-term projects. When funds are high and over a long term the investment in a project is greater than in a short-term, low funded project. Thus, administrators concerned about the financial stability of the Experiment Station and funding agencies interested in their monetary investment are likely to exert pressure to influence the direction of highly funded, long-term projects.

Those who fund research and the ties they have with agricultural experiment stations affect the type of research that is conducted. That issue and others have been explored by critics of the land grant system.

Critics of the land grant system. Recently various critics have expressed the belief that the land grant system views the farmer as a facilitator of efficiency who must cut costs and be concerned with production and efficiency without consideration of social consequences such as environmental harm or depopulation of the countryside (Schumacher, 1975:106; Hightower, 1972; Rodale, 1973; and Hadwiger, 1975). Consider the following statement by the USDA-NASULGC:

Although agriculture has been, and will continue to be, the economic and social base of rural America, our rural population is becoming largely a nonfarm one. By 1980, only one rural resident in seven or eight may live on a farm. It is generally agreed that it is neither socially desirable nor economically feasible today to try to arrest or even slow down this trend (in Hightower, 1972: 2).

Douglas and Shelly (1977:24) have questioned the assumption of the necessity and validity of larger farms and more advanced technology along with the resultant depopulation of the rural areas. In their study of Dunlap, Kansas, they found that this small rural community was neither dead nor dying. Further, they felt that an agricultural system with both large and small farmers does exist to some extent and that policies should promote such a system. The existence of small farms results in people needing services that can be provided by small communities, which in turn supports small community businesses. Goldschmidt (1946) has shown evidence of an interrelationship between small farms and community vitality.

Agricultural scientists and administrators are becoming increasingly aware of the costs of commercial agriculture such as rural-to-urban migration, environmental harm, and unemployment. A statement in an agricultural research bulletin explained the need for better resource management:

The Earth's resources are as finite as the blades of grass in a meadow. There are only so many acres of land, so many gallons of water, so many cubic feet of air. We cannot manufacture these basic requirements of life. Unfortunately, we including agriculture - are still exploiting them. It behooves us to manage our resources better than we have (Agricultural Research Service, 1972:1).

While agricultural scientists and administrators may be aware of problems and are seeking solutions, the land grant system does not readily accept criticism. According to Hadwiger,

Critics within the establishment are not appreciated, and outside criticism that cannot be dismissed as malicious, romantic, or uninformed is viewed as trivial in the context of agriculture's record of increased food production (Hadwiger, 1975:30).

Outside critics of the land grant system. In the last few years, numerous critics outside of the land grant system have voiced their objections to what they consider the failure of this institution (Hightower, 1972; Hightower and DeMarco, 1975; Watson et al., 1972; Rodale, 1973; and Friedland and Barton, 1976). Concerning Hightower and DeMarco's Hard Times, Hard Tomatoes, Nolan and Galliher (1973:491) stated "that the most provoking and visible analysis of rural life comes from outside the social science academic community in general, and outside rural sociology in particular." Rural sociology is largely supported by the USDA and the land grant system. Hightower and DeMarco's work (1972:245-47) investigated the land grant complex and found overall that the university held close ties with agribusiness, while excluding a large proportion of the remaining farm population and limiting the assistance the complex could have given them. Such aid could have been offered in such areas as cooperative marketing, access to credit, and land reform. Yet, this multi-billion dollar public investment tends to be technology-oriented

rather than people oriented.¹¹ In 1969, 289 man years of the agricultural experiment stations' nearly 6,000 scientific years were applied to people oriented research. Much of that research proved to be irrelevant, such as a study at Cornell, which showed that "employed homemakers have less time for housekeeping tasks than nonemployed homemakers" (Hightower and DeMarco, 1975:89-90).

Competition between the small farmer and agribusiness exists with agribusiness having an unequal proportion of aid from the land grant complex. Hightower and DeMarco gave the following example of the manner in which agribusinesses are overrepresented:

Corporate executives sit on college boards of trustees, purchase research from experiment stations, hire land-grant academics as private consultants, advise and are advised by land grant officials, go to Washington and state capitols to urge more public money for land-grant research, publish and distribute the writings of academics, provide scholarships and other educational support, invite land-grant participation in their industrial conferences and sponsor foundations that extend both grants and recognition to the land grant community (Hightower and DeMarco, 1975:94).

In a study similar to Hard Times, Hard Tomatoes, and with comparable results, Watson et al. (1972) completed an

¹¹According to Hightower (1976) people-oriented research is "A USDA term referring to research focused directly on people, rather than on production, marketing, efficiency or some other aspect of agriculture. The term includes twelve research problem areas: food consumption habits, food preparation, human nutrition, clothing and textile care, family financial management, rural poverty, economic potential of rural people, communications among rural people, adjustment to change, rural income improvement, rural institutional improvement, and rural housing" (Hightower in Merrill, 1976: 108-110).

examination of the land grant system at Cornell (NYS). One particular example concerned agribusiness, its close ties with the university, and greater benefits given to corporations. At Cornell, service to agribusiness included allowing individual agriculture professors up to two days per month of paid consultation, although that consultation was not to be with any business within the state or a branch of any business in the state. Permission may be sought for periods longer than two days per month. Records, however, are not kept so that there is no way of determining how well the rules are followed (Watson et al., 1972:106).

Hightower and DeMarco (1975) and Watson et al. (1972) argued that agribusiness and corporations have greater opportunities than small and organic farmers, farmworkers, and consumers to receive benefits from the land grant system. Those critics found that agribusiness had ties to the land grant system that other groups or individuals did not have. It is believed that research in the Kansas State Agricultural Experiment Station is also influenced by pressure from outside ties, particularly those groups or individuals who provide funds or who have the potential to influence funding sources. In this study those ties are examined mainly through interviews with Experiment Station researchers. A more direct analysis of the manner in which outside groups influence research is an area for further research.

Critics have argued that agribusinesses have had close and beneficial ties to land grant universities. It has also

been argued that the type of research conducted by the land grant system benefits different segments of the population to various degrees. The extent to which mechanization research aids agribusiness and farmers is explored next.

Mechanization research. In an attempt to increase agricultural productivity, the land grant system views mechanization research as vital. The National Association of State Universities and Land Grant Colleges (NASULGC) stated their goals as the following: (1) to reduce farm labor requirements and improve labor efficiency (crops and livestock) through mechanization, and (2) through use of systems analysis combine production and marketing techniques with "land, labor, capital, and management inputs" for the optimization of income. (Task Force on Farm Labor and Mechanization of USDA-NASULGC, as in Gutierrez et al., 1972: Section 16).

The land grant system has conducted research that has increased and improved mechanization, seeds, soil management, and the use of chemicals in farming (Dowd, 1974:163). Mechanization research is facilitated by the breeding of new varieties that are more suited to machines. Examples are the breeding of a tomato tough enough to be picked by a machine without being squashed, grapes that ripen uniformly, and apple trees that grow shorter so apples fall shorter distances to their mechanical catchers. Besides experimenting with breeding, researchers have used chemicals to cause fruits and vegetables to ripen at the same time, to reduce the

resistance of cherries to the pull of mechanical pickers, and to loosen various kinds of fruit before they are picked (Hightower and DeMarco, 1975:91).

While mechanization research has come to the aid of agribusiness, it has hurt many others, particularly the farm-worker who often was the first to be forced to leave agriculture. Their needs were not considered when the research was done, nor did they receive compensation or retraining (Schmitz and Seckler, 1970). The development of the tomato harvester is an example of the replacement of farm labor by machines. According to Friedland and Barton (1976:37), it was estimated that in 1964, 50,000 laborers worked the tomato harvest in California. In 1972, the number of laborers was estimated at 18,000 while production had increased 50 percent. The proportion of the tomato crop in California that was machine harvested increased from 1 percent in 1962 to 99.9 percent in 1970 (Friedland and Barton, 1976:39).

Evidence has been given that small farmers also do not benefit from mechanization research. In 1971, several large, vertical integrators of poultry in Maryland divested their holdings and did not renew purchasing contracts with local farmers in Maryland and Delaware. Around that time several processing plants were closed, thus forcing many people on welfare. Yet, at the state agricultural experiment station not one of the 29 projects examining various stages of the poultry business was devoted to helping poultry farmers who face such a crisis (Gutierrez et al., 1972: Sect. 19).

Rodale (1973:52-53) saw the land grant university and major agricultural corporations attempting to industrialize agriculture and, thus, ignoring yet another segment of small farmers, those who use organic methods. The assistance given by the land grant system is rarely directed specifically toward organic farmers. Overall, Rodale argued that chemical and mechanical research has been of little help to organic farmers. Yet, some research has been helpful, through the development of small scale machinery (i.e. rotary tillers) and some experimentation with biological insect control. Experimentation has also combined biological and chemical means by using chemicals to confuse mating scents of insects so they fail to reproduce.

Inside critics. Individuals and groups in the land grant system have also become concerned with the quality and direction of research. Two such examples, a study by experiment station administrators and the Pound Report, are presented.

In 1965, a group of administrators from agricultural experiment stations cataloged all USDA and experiment station research projects (Hadwiger, 1972d:2806). Areas where expenditure increases were recommended included consumer health, nutrition, rural people, and rural communities. In 1965, 12 percent of the experiment station expenditures were in those areas (Robinson, 1971:238). By 1970, the expenditures in those areas increased to 16 percent, with the remainder centering on some aspect of commercial agriculture or forestry (Hadwiger, 1972d: 2806).

Yet, that 16 percent did not reflect the total picture. Hadwiger cataloged the 1970 research projects on housing, which was one of the USDA categories under the heading of rural people. He discovered that 80 percent of the housing research concerned technical aspects of housing construction and maintenance. Further, he claimed that it was directed towards the housing and construction industry. The remaining 20 percent of housing research was centered around the description of rural housing conditions and what caused certain conditions. It was presumed that technical efficiencies in housing would be passed on to the consumer. Yet, there was no project designed to measure efficiency of the housing industry (Hadwiger, 1972d:2808; see also Appendix A).

According to Wade (1973b:390), a survey of federal and state agricultural research was prepared by a committee headed by Glenn Pound, Dean of the College of Agriculture, University of Wisconsin, and convened by the National Academy of Sciences. The report covered basic biological research, forest, environmental, and sociological research, and the agricultural research enterprise in general. The criteria used in judging the research was not stated. It was concluded that much of the research was duplicative or inefficient (Wade, 1973a:45). An evaluation of such areas of USDA and State Agricultural Experiment Station (SAES) research as reproductive physiology, found 42 percent of the projects rated as poor. In molecular biology only 8 percent were judged to be of a caliber to receive support from the National Institute of Health or the

National Science Foundation. Of the 225 projects in reproductive physiology reviewed by the committee, 43 dealt with hormone secretion and were repetitive (Wade, 1973a:45).

The Pound committee panels included one directed by Hathaway and another by Hobbs. The Hathaway panel recommended a redirection of USDA research priorities toward people and the community. It was found by that panel that social science research by the USDA and SAES was 90 percent economics and 10 percent sociology. Of the USDA's 539 scientific man-years allotted to the social sciences in 1969, 18 were devoted to sociology. In looking specifically at rural sociology research conducted by the USDA and SAES, the Hobbs panel also found much the same as the Hathaway panel. Reasons given for little research in sociology included administrators' definition of what should be researched and the tendency to shift research emphases as political priorities change (Wade, 1973d: 720-721).

Hadwiger (1972d) and the Pound Report (in Wade, 1973a, 1973d) claimed that the proportion of research in the areas of rural development and sociology are among the smallest of all research areas. The following hypothesis is based on that claim:

Hypothesis 4: At the Kansas State Agricultural Experiment Station, the areas of rural development and sociology are areas with among the smallest proportion of research funds and number of research projects. Further, the amount of research funds and number of projects are not increasing

proportionally as the total funds and projects increase.

Throughout the development of the land grant system, technology and volume of production have been emphasized rather than rural development and sociology (Friedland and Barton, 1976; Mishan, 1969). The land grant system was seen by conservative agriculturalists as a means to improve their economic situation through technology (Soth, 1970; Dowd, 1974). Thus, the land grant system was better suited to meet the needs of the conservatives than those of the radical agrarians who sought change through political means rather than through technology. It is difficult to know the direction the land grant system would have taken if the radical agrarians had exerted a greater influence on land grant universities. However, the Populists' brief control of Kansas State Agricultural College resulted in an increase in economics courses in an attempt to understand how economic and political factors affected farmers and laborers lives (Carey, 1977).

How the land grant system responds to criticism. An organization faced with criticism must adapt to that feedback in some way. If the land grant system accepts the criticism as valid, attempts to change are likely to occur. If the negative feedback is not accepted, the land grant system will deal with criticism in various ways. The following situations indicate the ways in which the impact of criticism have been diminished.

In the 1960's, the land grant system did not seem to be overly anxious to become involved in the social sciences,

particularly in such issues as food and hunger in the United States. According to Hadwiger (1972d:2808-2809), the USDA agencies administering land grant research or the Extension Service had not let the public know the extent of hunger nor the possibility that their programs aimed at combatting hunger were not working. Thus, it remained for the civil rights movement and its leaders to enlighten the public on those issues and to carry the banner for the rural poor. Later, congressional efforts attempted to reform the programs, while an outside group produced the critical report on food assistance programs called "Hunger, U.S.A.," and a report of the school lunch program called "Our Daily Bread." The land grant system responded by belittling the critics' credentials, while describing the critics as self-interested and seeking notoriety. Further, the land grant system attempted to minimize the seriousness of the hunger issue by calling it a long withstanding problem and not a crisis (Hadwiger, n.d.:7).

The land grant system's response to Hightower and DeMarco's (1972) study, Hard Times, Hard Tomatoes, is another example of how the land grant system deals with criticism. According to Hadwiger (1975:40), while Hightower gained considerable publicity and news coverage of his critical evaluation of the land grant system, agricultural college representatives were equally effective at winding down the interest of the public and senators. At the hearings before the Senate Labor Subcommittee on Migratory Labor, one official distributed the so-called "hard" tomatoes to the chairman and audience,

claiming those tomatoes were delicious and consumers liked them. (In a subsequent consumer survey, consumers ranked tomatoes as lowest in quality of all food items in the grocery store.) President Harry Caldwell, of North Carolina State University, principal defendant of the land grant system, defended the large agribusiness corporations and stated that critics of big agriculture "bring with their concern an ignorance, an innocence, and a romanticism that misses the point entirely" (in Hadwiger, 1975:40).

Summary

Funding allows the land grant system to function. Because funding agencies provide a necessary resource, it is argued that these agencies are sources of influence on the type of research that is conducted and who benefits from the research. However, critics have often disagreed with the direction the land grant system is going. They claim that input from other groups and individuals is needed. As Hadwiger stated,

New winds buffet this establishment - consumers, environmentalists, the media, some elected officials, enlightened insiders, and in the future, maybe, antithetical farmers and even a giant or two. But these have yet to form a coalition that can give agricultural research the breadth of perspective that a great research establishment ought to have (Hadwiger, 1975:12).

Chapter 2

METHODOLOGY

Method of Procedure

The open systems model examines the interaction between an organization and its external and internal environment. To analyze the factors influencing the selection of research topics in the Kansas State Agricultural Station, it is necessary to examine how organizations and individuals outside of and within the Experiment Station affect decisions to research particular topics. Rather than looking at only one element in the decisionmaking process, several methods were used to analyze the organization of the Kansas State Agricultural Experiment Station. Those methods are:

- (a) a description of the organizational structure of the Experiment Station;
- (b) an explanation of the role of university funding groups - the Kansas State University Research Foundation and the Kansas State University Endowment Association;
- (c) classification of research projects and funding groups; and
- (d) selection of the sample of projects and conducting of interviews with the principal investigators.

Organizational Structure and University
Funding Organizations

First, an organizational framework and its relation to the Kansas State Agricultural Experiment Station is

discussed. A structural chart of the Experiment Station and its place in the structure of the university is presented. Data on funding was gathered through various official documents such as the Biennial Report of the Director, CRIS,¹ and Funds for Research at State Agricultural Experiment Stations and Other Institutions.

Attempts were made to determine whether funds given through the Endowment Association and the Research Foundation allow the funding agency priority in patenting research results or specifying research topics. Further information on the administration and the role that funding and other factors play in the selection of research topics was gathered through the classification of projects and funding sources and through interviews with researchers in the Experiment Station.

Classification of Research Projects and Funding Groups

To assess the administrative processes leading to decisions concerning type of research, several steps were followed. Based on the Biennial Report of the Director, projects for the three bienniums 1970-72, 1972-74, and 1974-76 were classified according to the subject area of research,

¹The Current Research Information System (CRIS) is "A USDA data bank containing computerized information on research projects conducted at state agricultural experiment stations" (Hightower in Merrill, 1976:108-110).

the number of years each project was conducted, and the source of funds. Subject areas included Agricultural Economics, Soil and Water, Plant Science, Animals and Animal Feeds, Animal Diseases, Plant Diseases, Agricultural Engineering, Food Science, Other Home Economics, Other (Basic), Social Science, Kansas Water Resources, Miscellaneous, Rural Development, and Food and Feed Institute. The category Other Home Economics refers to Home Economics projects not included in Food Science. Funding sources included the categories of: State, Federal-State, Federal, Private, Foundations, Agricultural Interest Groups, and Miscellaneous. The category of Federal-State included those projects that received funds from both federal and state agencies.

After projects were classified by area and funding source, subject areas were combined into related categories. Group 1 included Agricultural Economics, Social Science, and Rural Development; Group 2 - Soil and Water and Kansas Water Resources; Group 3 - Plant Science and Plant Diseases; Group 4 - Animals and Animal Feeds and Animal Diseases; Group 5 - Agricultural Engineering; Group 6 - Food Science, Other Home Economics, and Food and Feed Institute; and Group 7 - Other (basic research). The area Miscellaneous was omitted as it did not seem to represent one homogenous area but a random mixture of topics.

Funding sources were also reclassified into the categories of (1) State; (2) Federal, Federal-State; and (3) Private, Foundations and Agricultural Interest Groups. Those

categories were chosen as it is argued that each represents a distinct type of influence on the researcher. Projects sponsored by federal agencies and federal-state combined are accountable to a wider public than are state agencies. As foundations, private groups, and agricultural interest groups are not part of the government they were grouped together. The interests and constituents of private, foundations, and agricultural interest groups are likely to differ from those of federal and state. The population to which the former relates is probably small and specialized compared to that of state and federal funding groups. The funding category of Other was omitted as it was very small, and sources were diverse. Using the new categories for subject areas and funding sources, projects were again classified. Further data on the classification of projects is found in Chapter III - The Analysis of Research Findings.

Selection of the Sample

The sample was composed of fifty-one projects out of the 949 conducted in the Experiment Station and listed in the Biennial Report of the Director during 1970-76. The number of projects chosen from each of the seven subject groups was proportional to the number of projects in that group. Each project had a distinctive classification number so that sample projects were selected using a random numbers table. The sample number was limited by the length of the interview and the decision to interview the principal investigator from

each department involved in the project. Fifty-one projects were selected rather than fifty so that the number of chosen projects in each group would be proportional to the total number of projects in that group.

In the selection process, some projects were not included as the investigators were at outlying experiment stations, or were no longer at the Experiment Station due to retirement, sabbatical leave or employment elsewhere. When there was more than one researcher and at least one was available while others were not, the project remained part of the sample. In a few cases, two projects were included if one of the projects had another investigator. In no case was the same researcher interviewed for two projects. The area of Kansas Water Resources included projects conducted at both Kansas State University and Kansas University, and projects chosen from either school were included in the study.²

Of the 96 researchers contacted, only three researchers declined to be interviewed. One researcher had just returned from Japan and felt that he was too busy. One had not done research for more than ten years although his name was still listed on the project. He felt that he would not be able to

²It was decided to include projects from Kansas University in the sample as both universities have input into the decisionmaking process on research in the area of Kansas Water Resources. A local committee from each school initially screens that university's projects. Then a committee including three representatives from Kansas University and three from Kansas State University selects the projects that will be funded.

give useful information, since it had been so long since he had done research. One department head did not wish to be interviewed since he no longer was an active researcher on that project. In the last two cases, other researchers were listed so the projects did not need to be eliminated from the sample.³

Three projects chosen at random involved researchers at Kansas University. Two of the projects were eliminated from the sample as the researchers were no longer with the university. In selecting replacements, the projects from Kansas University were not included thus biasing that portion of the sample. That error was discovered after the interviews had been completed. In order not to jeopardize the results, I carefully examined those two projects to determine if they were extreme cases, which they appeared not to be.⁴

Research Instrument

The principal method of analysis was an in-depth interview of 53 researchers in the Kansas State Agricultural Experiment Station. The interview provided a situation in which the interviewer encouraged detailed responses and probed

³The sample included only one project where more than one researcher was available to be interviewed. As three researchers were interviewed on that project, the sample consisted of 51 projects and 53 researchers.

⁴Variables examined included who selected the research topic, source of funds, whether a topic was a primary-priority area, whose needs were met by the land grant system, and whether a researcher experienced pressure.

the ideas of the respondent when appropriate. The interview schedule consisted mainly of open-ended questions and provided an opportunity for extensive discussion. Since the researcher could provide the detail he/she considered necessary, interviews ranged from fifteen minutes to two hours. Most of the interview questions involved researchers' opinions on the factors influencing the selecting and conducting of research. A copy of the interview schedule is found in Appendix C.

The interview schedule included questions on the researcher's educational and professional background to discover whether researchers came from similar backgrounds. Further background data included the source of funds and the researcher's academic department. To assess the influence of the administration or outside groups on research, data were gathered on the selection of the project topic, priority areas of the Experiment Station, Experiment Station support of the project, and pressure to research or not research particular topics. Questions analyzing the type of research conducted included information on whether there was sufficient research on the stated research topic and whether it was an over-emphasized area of research. To assess the potential effects of research, information was gathered on who benefits from a project and how well the land grant system serves the needs of consumers, farmers and others. To examine the links between researchers and outside groups, several questions centered on researcher participation on boards of directors

of corporations or agricultural interest groups, and involvement in consulting with a corporation, agricultural interest group, or governmental agency. Whether the stated research project was a primary area of the researcher, the probability that vital research would be funded, and the type of research the respondent was conducting and would like to conduct measured whether a researcher was conducting research he/she desired.

Independent and Dependent Variables

The main independent variables in this analysis are the amount and source of funds and the length of the project. Data on the amount of funding by project was obtained from CRIS and included the total funds during 1971-76, the average annual funding, and the highest amount of funds during any one year. The average annual funds were divided into the categories of low, medium, and high funds. Funds of \$1 to \$4,999 were considered low; \$5,000 to \$25,000 were medium; and \$26,000 to \$127,000 were high. With the data on total funds for each project, three categories were also developed. Low funded projects had \$1 to \$8,000; medium had \$10,000 to \$80,000; and high had \$100,000 to \$1,800,000. The data on highest funds during any one year were not used as funds on a particular project usually varied greatly from year to year.

Categories for the source of funds included State, Federal, Federal-State, Private, Foundations, and Agricultural Interest Groups. Those categories were again combined into

(1) State; (2) Federal, Federal-State; and (3) Private, Foundations, and Agricultural Interest Groups.

Information on the length of each project was gathered from CRIS and was divided into three categories. Short-term projects were those funded for one year, medium length for two to five years, and long-term for six to twenty-one years.

The major dependent variables included pressure to research, primary area of researcher, priority areas of the Experiment Station or department, and who selected the research topic. Open-ended questions on the interview schedule measured those variables. Each respondent was asked whether he/she felt any pressure by the Experiment Station, his/her department, colleagues, or others to research particular topics. Other questions concerned the researcher's opinion on whether the project was and should be a priority area of the Experiment Station or department and whether the project was a primary area of the researcher. After coding a variety of remarks, the data on researcher pressure and priority primary areas was grouped into yes-no responses.

Several interview questions dealt with who selected the research topic. Each researcher was asked what criteria were used in determining the topic of the project and who initiated/developed the topic. The criteria for developing research was determined by: (1) the researcher and/or other researchers perceiving a need or expressing an interest; (2) the need or interest of funding agencies; (3) a combination of researcher and funding agency; and (4) other. The question

asking who initiated/developed the project topic was another indicator of the research selection process. The responses fell into the categories of: (1) the respondent/or other researchers; (2) the funding agency; (3) a combination of the researcher and the funding agency; and (4) other. For both questions on selection of topic, the category of "other" was not used in the statistical analysis as it represented a miscellaneous group.

Administration of the Interview Schedule

After the projects were classified, the sample selected, and the interview schedule developed, a pretest was made. For the pretest, five projects were chosen at random from the five largest research groups and an interview was conducted. After the pretest was completed, the questions on the selected research topic, vital areas of research, and the ability of the land grant system to meet the public's needs were revised. At that point, each researcher in the sample was contacted by phone and scheduled for an interview. At the time of the interview, each researcher was presented with a consent form and a letter of introduction from Dr. Floyd Smith, director of the Experiment Station. Interviews were conducted with each researcher in their office between September, 1977 and November, 1977. The interview schedule, letter of introduction, and consent form were approved by the Committee on Human Subjects (copies in Appendix C).

Statistical Procedure

For the computer analysis, the Statistical Package for Social Science (SPSS) was used. Data was analyzed tabulating frequencies and using cross-tabulation tables and a chi-square statistic. The chi-square level of significance used was less than or equal to .10.

Chapter 3

ANALYSIS OF RESEARCH FINDINGS

Introduction

To understand how topics of research are selected in the Kansas State Agricultural Experiment Station, it is necessary to examine the interaction of this system both with researchers and the outside environment. As part of the land grant system, the Kansas State Agricultural Experiment Station is affected by: (a) the historical situation from which land grant universities arose; (b) the socialization of researchers; (c) the need for funds; and (d) critics of the experiment station. In this study, data on funding and researchers' perceptions of their role along with the pressures they face as part of the land grant system are explored mainly through interviews with agricultural experiment station researchers.

Project background. The projects were chosen proportionally from each of the seven research areas. The departments ranged from the social sciences, agricultural engineering, and home economics to the plant and animal sciences. Table 1 shows the number of projects in each area by the source of funds. The column totals explain the percent of projects funded by a funding source in a particular subject area compared with the total number funded by that source.

The areas of Animals and Animal Feeds and Plant

Table 1
 Projects Grouped by Area and Funds
 1970-76

Type of Funds	Research Area			
	Agricultural Economics %	Soil and Water %	Plant Science %	Animals and Animal Feeds %
State	34	37	36	22
Federal-State	31	19	17	25
Federal	15	14	6	6
Private	6	28	26	36
Foundations	6	2	12	5
Agricultural Interest Groups	6	--	2	5
Miscellaneous	2	--	1	--
Total	100 (n=65)	100 (n=57)	100 (n=170)	99 (n=152)
	Animal Diseases %	Plant Diseases %	Agricultural Engineering %	Food Science %
State	29	14	44	30
Federal-State	8	23	9	30
Federal	23	9	31	8
Private	24	43	13	22
Foundations	12	9	--	7
Agricultural Interest Groups	3	1	--	3
Miscellaneous	1	1	3	--
Total	100 (n=169)	100 (n=81)	100 (n=32)	100 (n=100)

Table 1 (cont.)

Type of Funds	Research Area			
	Other Home Ec. %	Other (basic) %	Social Science %	Kansas Water Resources %
State	69	35	71	7
Federal-State	13	9	21	2
Federal	6	26	4	90
Private	--	1	--	--
Foundations	--	28	--	1
Agricultural Interest Groups	--	--	--	--
Miscellaneous	13	1	4	--
Total	101 (n=16)	100 (n=81)	100 (n=24)	100 (n=89)
	Miscellaneous %	Rural Development %	Food and Feed Institute %	Total %
State	6	--	--	28
Federal-State	6	29	--	18
Federal	50	71	52	21
Private	6	--	24	21
Foundations	31	--	19	9
Agricultural Interest Groups	--	--	--	2
Miscellaneous	31	--	5	2
Total	99 (n=16)	100 (n=7)	100 (n=21)	101 (n=976)

Diseases had the highest proportion of non-government sponsored projects (private groups, foundations, and agricultural interest groups). Forty-six percent of the projects in the area of Animals and Animal Feeds were funded by private sources.¹ Fifty-three percent of the projects in the area of Plant Diseases were funded by private groups. Several areas had a low percentage of projects sponsored by private money. The areas of Social Science, Rural Development, and Other Home Economics had no projects funded by private sources. Kansas Water Resources had one percent, Agricultural Engineering had 13 percent, and Agricultural Economics had 18 percent.

Table 2 shows the number and proportion of projects by the funding source and biennial year. State funded projects had the greatest percentage increase from one biennial year to another with 28 percent of the total funded projects in 1970-72 and 33 percent in 1972-74. The number of projects in the Experiment Station in each biennium did not change greatly from the 1970-72 to the 1974-76 biennium. In 1970-72 there were 593 projects and in 1974-76 there were 639 projects.

Table 3 lists the number and proportion of projects by area in 1970-76. The areas of Plant Science and Animals and Animal Feeds had the highest percentages of total projects

¹"Private" used alone hereafter will refer to the group including private, foundations, and agricultural interest groups. "Federal" refers to federal, federal-state sponsored projects.

Table 2
 Projects Classified According to Source of Funds

Type of Funds	% of Total			
	1970-72	1972-74	1974-76	1970-76
State	28	33	34	32
Federal-State	22	22	20	21
Federal	19	17	16	17
Private	20	18	19	19
Foundations	8	9	7	8
Agricultural Interest Groups	2	1	2	2
Miscellaneous	1	1	2	1
Total	100 (n=593)	101 (n=600)	100 (n=639)	100 (n=1832)

Table 3
Projects According to Areas 1970-76

Research Area	No. of Projects	% of Total
Plant Science	170	17
Animals and Animal Feeds	152	16
Kansas Water Resources	89	9
Food Science	87	9
Plant Diseases	81	8
Other (basic research)	81	8
Animal Diseases	78	8
Agricultural Economics	65	7
Soil and Water	57	6
Agricultural Engineering	32	3
Social Science	24	2
Food and Feed Institute	21	2
Other Home Economics	16	2
Miscellaneous	16	2
Rural Development	7	1
Total	976	100

with 17 percent and 16 percent of the total. Plant Science increased from 16 percent of the total projects in 1970-72 to 20 percent in 1974-76. Animals and Animal Feeds decreased from 17 percent in 1970-72 to 15 percent in 1974-76. Areas with one-two percent of the total projects included Other Home Economics, Social Science, Miscellaneous, Rural Development, and Food and Feed Institute. Projects in those areas held one-two percent of the total projects in both 1970-72 and 1974-76, with the exception of Social Science which increased to 2.6 percent in 1974-76. Rural Development was a new category beginning in 1974-76. The number of research projects in those areas at Kansas State University are increasing only slightly if at all. As Hadwiger (1972d: 2806) stated, the areas of social science and rural development claim among the smallest proportions of research funds and time.

In this study, five projects out of 53 were researched from the group that included the areas of Social Science, Agricultural Economics, and Rural Development. The mean amount of average annual funds for the four projects from that group with funding amounts available from CRIS was \$2807, and the median was \$2304. The mean amount of average annual funds for the 43 projects with funds reported from CRIS was \$28,048, and the median was \$5,950. Therefore, Hypothesis 4 that the areas of rural development and sociology claim among the smallest proportion of funds and number of research projects is supported.

After the subject areas and funding sources were combined into new categories, projects were classified by area and by funds in Table 4. Plant Science-Plant Diseases and Animals-Animal Diseases were the two largest categories with 26 percent and 24 percent of the total projects. Those groups also had the largest percent of their projects funded by private sources with 45 percent for Plant Science-Plant Diseases and 41 percent for Animals-Animal Diseases. Those groups were unique because they had more projects funded by private sources than by federal or state.

Using the information on projects by subject area and funding source, the sample was selected. The number of projects selected from each category was proportional to the number of projects in that area during 1970-76. Table 5 shows the distribution of projects selected. The number of projects in the area of Agricultural Engineering funded by private, foundations, and agricultural interest groups comprised one percent of the total projects. As the sample of 51 projects was small, I decided not to select any projects from that group in an attempt to provide an accurate overall representation of the research projects.

Organization of the Kansas State Agricultural Experiment Station. The Kansas State Agricultural Experiment Station was organized under the Hatch Act on February 8, 1888. It is located in Manhattan, Kansas with branch stations and experiment fields throughout the state (see Appendix D). The organizational chart (Appendix E) shows the structural line

Table 4
Project Groups by Area and Funds
1970-76

Research Groups	Source of Funds				Total* %
	State %	Federal, Federal-State %	Private, Found. & Ag. Interest Groups %	Total*	
Agricultural Economics, Social Science, and Rural Development	14 41	11 46	4 13	10 100	
Soil and Water and Kansas Water Resources	10 18	27 69	6 11	15 98	
Plant Science and Plant Diseases	26 29	17 26	37 45	26 100	
Animals and Animal Feed and Animal Diseases	21 25	21 34	32 41	24 100	
Agricultural Engineering	5 45	3 42	1 13	3 100	
Food Science, Other Home Economics, and Food and Feed Institute	14 31	13 39	12 31	13 101	
Other (basic research)	10 35	7 35	8 30	8 100	
Total	100 29	99 39	99 32	99 100	
	(n=274)	(n=374)	(n=301)	(n=949)	

Table 4 (cont.)

*In pairs under "Total": column percentage listed first - showing % of that source of funds going to that type of project.
row percentage listed second - showing % of that type of project funded by that source of funds.

Table 5

Number of Projects Selected by Area and Funds
1970-76

Research Groups	Source of Funds						Total	
	State		Federal, Federal-State		Private, Found. & Ag. Interest Groups		No.	%
	No.	%	No.	%	No.	%	No.	%
Agricultural Economics, Social Science, and Rural Development	2	41	2	46	1	13	5	100
Soil and Water and Kansas Water Resources	1	18	5	69	1	11	7	98
Plant Science and Plant Diseases	4	29	3	26	6	45	13	100
Animals and Animal Feed and Animal Diseases	3	25	4	34	5	41	12	100
Agricultural Engineering	1	45	1	42			2	100
Food Science, Other Home Economics, and Food and Feed Institute	2	31	3	39	2	31	7	101
Other (basic research)	2	35	2	35	1	30	5	100
Total	15	29	20	39	16	32	51	100

from the president of the University to the Experiment Station and the five branch stations under it. Appendix F further charts the Experiment Station's formal organizational structure.

As later discussed, funding seems to influence various aspects of research in the Experiment Station. After the projects were classified according to source of funds and by research area, another table was developed based on information from the Financial Report, Kansas State Agricultural Experiment Station (Appendix G). The type of research expenditure was classified according to the research area in which it fits. The percentage of research expenditure was then totaled for each research area. A pie chart further shows the percentage of total projects by source of funds. Federally funded projects represented a larger total, while state and private projects were nearly equal.

University funding groups. At some universities an individual or corporation donating money for research may state the terms of the contract, have preferential treatment getting a patent, or veto research of which they disapprove (Hightower and DeMarco, 1975; Watson et al., 1972; and Pirages and Ehrlich, 1974). Hypothesis 2c states that groups donating money are given a priority in receiving a patent. To assess that hypothesis, information from the Kansas State University Endowment Association and the Kansas State University Research Foundation was gathered.

Kansas State University Endowment Association. To understand the role donations to the Endowment Association have on

research, I spoke with Larry Weigel, Vice President for Private Support Programs for the Endowment Association. He reported that money donated to the University through the Endowment Association supports departmental activities but does not support research in the Experiment Station. A private funding group wishing to sponsor research provides funds through the Experiment Station and not through Endowment.

Kansas State University Research Foundation. I spoke with John Murry, Associate Dean for Sponsored Programs, Graduate School. He stated that because patenting procedures are costly, a researcher has the option of obtaining a patent through the Research Foundation. The Research Foundation at Kansas State is independent of other university departments, and researchers from any university department may apply for a patent through the Research Foundation. The Foundation will pay for the costs of the patent. If the research product is patented, the Foundation receives a percentage. No state funds are used to operate the Foundation. The percentage it receives from patents is used to run the organization and obtain more patents. The Foundation will sometimes fund research if there is excess money.

Outside research contracts may stipulate who owns potential patent rights. According to Murry,

The Regents patent policy provides for the conveying of patent rights only if the contracting agency is a branch of the Federal Government, or . . . if the contractor pays all of the costs of research, both direct and indirect (Murry, 1975:2).

As the University is a public institution it is committed to open and free dissemination of research results. Even when research sponsored by outside sources is patented, the University retains the rights to publish results. A period of confidentiality is allowed, however, so that the patent may be obtained (Murry, 1975:2).

In summary, funds donated through the Endowment Association do not support research in the Experiment Station. Through the Research Foundation a researcher may obtain a patent for research results. Further, an individual or corporation donating money through the Experiment Station is not given preferential treatment in getting a patent. As mentioned, in order for an outside funding group to obtain a patent, it must pay all direct and indirect costs of the research. If such a patent is obtained, the University retains the right to publish research results. Thus, individuals or groups donating money are not given priority in receiving a patent and Hypothesis 2c is not supported.

Results from the Interviews of Researchers

Researchers in agricultural experiment stations use funds and other resources to develop new information and products. This section examines how researchers perceive their role as part of the Kansas State Agricultural Experiment Station as expressed in the interviews. How much freedom do they have, what are the pressures they feel, and do they perceive the Experiment Station and the land grant system as

fulfilling its mission?

As there has been little research in the area of selecting research topics in agriculture, much of this thesis is exploratory. Since many of the factors involved are not well defined, the interview schedule was composed mainly of open-ended questions. As a result, information from each of the interviews varied greatly in amount and kind, yet as much of the data was coded as possible. The information that is not comparable for a majority of the cases and those cases where the majority of the responses fell into one category are described with no further statistical analysis. Those cases in which the responses of researchers were not supportive of the Experiment Station or represented a minority viewpoint are further described in order to understand their divergence from the more common response.

Researcher background. Based on the arguments of Hadwiger (1975), and Bem and Bem (n.d.) concerning the socialization and freedom of researchers, it was hypothesized that agricultural researchers would hold basically the same views as the administration of the Experiment Station (Hypothesis 1). Data from the interviews were not sufficient to test that hypothesis. However, the following subhypotheses were examined: (1a) researchers in the Experiment Station have similar educational backgrounds; (1b) the majority of the researchers in the Experiment Station select the topic of research they will conduct; and (1c) researchers and administrators view the same research areas as priorities. An

analysis of Hypothesis 1c was limited to researchers' perceptions of administration priorities.

Several questions were asked in the interview centering on the background of the researcher to discover whether researchers came from similar backgrounds. In looking at their education, it was found that the majority of the researchers had a Ph.D. (47 researchers, 89 percent), with only 3 (6 percent) having a masters as the highest degree, 2 researchers (4 percent) a DVM, and 1 (2 percent) both a DVM and a masters degree. As to whether their graduate work developed into the research project, 3 respondents (6 percent) stated that it had, 27 (51 percent) that it was in the same area, and 22 (42 percent) that it had not developed into the research topic.

All researchers were also asked where they received their final degree. Forty-three researchers attended a land grant university, six attended nonland grant universities, and four researchers gave insufficient information. Those data follow the prediction of Hypothesis 1a that researchers have similar backgrounds. As Hadwiger (n.d.) argued, most researchers in an agricultural experiment station received their education at a land grant university. Education is one aspect of a researcher's background. To understand whether researchers are socialized into the land grant system, and, if so how, an indepth analysis of the factors shaping the background, values, and goals of researchers would be necessary.

Project selection. If researchers are socialized to

have the same views as the administration, it is likely that researchers will have the freedom to choose research topics. Yet, as funding is vital to the continued functioning of the Experiment Station, receiving funds through various means may influence who determines the project topic. Do researchers develop their own research projects? If so, do they select a topic and then search for funds or are prior funds available? Many of the questions, such as whether the topic was developed before or after funds were sought, were aimed at discovering the degree of freedom the researcher had in selecting the project topic.

On the question of whether the topic was developed before or after funds were sought, 27 researchers (51 percent) stated that the project topic was developed and then funds were sought; 3 (6 percent) said that funds were available first; 4 (8 percent) said that the funding agency stated a general area with the specific topic to be decided by the researcher, and in 11 cases (21 percent) the topic was developed by others such as the administration, funding agency, etc. It would have been useful to know the degree to which the researcher tailored the project to his/her perception of what the funding agency would fund as an indicator of the degree of freedom a researcher actually has. Did the researcher who developed a topic follow different procedures than the researcher whose topic was developed by others?

It was hypothesized that the majority of the researchers in the Experiment Station would select their research topic

(Hypothesis 1b). Several questions were used as indicators of the manner in which the research topic was selected. One such question was, "What were the criteria used in determining the topic of the project?" In response to that question, 33 researchers (62 percent) stated that the project topic was developed by the researcher and/or other researchers on the project topic utilizing their own criteria such as interest in or need for the project. In ten cases (19 percent) the funding agency, outside individuals, or organizations expressed an interest or need for the topic, with a combination of researcher and funding agency selecting two additional projects (4 percent). In five cases (13 percent), the project was long term, and it was not stated who selected the topic. Two researchers (4 percent) described the criteria only in terms of the information to be received. In examining who chose the topic by the source of funds, there was no significant difference between whose criteria influenced the project topic and the funding source (Table 6).

Another question asked, "Who initiated/developed the project topic?" In an even larger percent of the cases than on the question of determining criteria, the researcher and/or other researchers were responsible for developing the project topic (39 researchers, 75 percent). In four cases (8 percent) the funding agency or other outside groups developed the topic, three (6 percent) of the respondents said it was a combination of those first two categories. Six cases (11 percent) were long-term projects with no statement as to who

Table 6

Criteria Determining Project Topic By Source Of Funds

Whose Criteria Determined Project Topic	Source of Funds			
	State %	Federal %	Private %	Total %
Researchers and/or Other Researchers	85	71	67	73
Funding and/or Other Outside Groups	15	24	27	22
Combination of Researchers and Funding Groups	0	6	7	4
Total	100 (n=13)	101 (n=17)	101 (n=15)	100 (n=45)

Chi square = 1.6

4 degrees of freedom

Chi Square Significance = .81

first initiated the project. In examining who initiated the project topic by the source of funds, there was no significant difference between who initiated the project topic by funding category. (See Table 7). That data shows evidence that researchers chose their research topics in most cases (Hypothesis 1b supported).

Of those projects that were chosen by the funding source, three were funded by private groups. In an agricultural economics project the funding group stated the general topic area, and the researcher chose the specific topic in

Table 7
Who Initiated Project Topic By Source Of Funds

Who Initiated Project Topic	Source of Funds			
	State %	Federal %	Private %	Total %
Researchers and/or Other Researchers	93	82	80	85
Funding and/or Other Outside Groups	7	12	7	9
Combination of Researchers and Funding Groups	0	6	13	7
Total	100 (n=14)	100 (n=17)	100 (n=15)	100 (n=46)

Chi square = 2.4

4 degrees of freedom

Chi Square Significance = .65

the area of farm management. In a privately funded plant pathology and in a surgery and medicine project, chemical companies approached the researchers and requested specific chemicals tested. In the case of the plant pathology project the researcher was already interested in the chemical, while in the other the researcher was not. The four remaining projects with topics stipulated by the funding source were funded by federal and in one case federal-state sources. Of those, an agronomy and a chemistry project dealt with effects of chemicals, a sociology project with a service, and a grain science project with grading and testing of grains.

Thus, the majority of the researchers felt that they and/or other researchers selected and developed the project topic. When the topic was developed primarily by someone other than the researcher, the researcher was asked the degree of freedom if any he/she had in selecting the topic. In only eight projects (15 percent) did the researcher state that others (funding agency, outside individuals or organizations, long term project) chose the topic. Five researchers (9 percent) stated that a general topic was specified and the researcher was allowed to develop the specific topic. Responses on that question were similar to those on the previous question (who selected/initiated the project topic). One researcher in agronomy explained that through his project, private companies pay to have grain tested. In a federally funded project in agronomy, requests from the public were submitted for research on diseases in grain. The researcher and his colleagues generally chose which requests were researched.

In answering those questions on selection of topic, some researchers expressed a feeling of freedom in conducting their research while others felt restricted. For instance, one researcher who was supported by a commercial company selected and developed his research topic himself. The company had never placed restrictions on him, although he said he knew of cases where researchers had been restricted. Another researcher who was interested in working in a new area had difficulty with the administration who at times would

appear to support and encourage research in that area. At other times, support was absent. Requests to apply for outside funds were rejected, yet the Experiment Station would not fund research on that topic. He thought that his department did not have very good or close relations with the Experiment Station.

Several factors could account for the number of researchers developing their own project topic and selecting the topic before seeking funds. First, researchers may actually have a great deal of freedom in choosing the topic. It could also be related to the manner in which researchers develop topics so that funding agencies will accept them. If researchers only submitted projects they thought would be funded rather than research they thought was important, they would be constrained. Applying for grants is time consuming, and it is doubtful that researchers would often apply for a grant unless it is similar to what the researcher wants to research. The number of researchers developing their own project topic might also mean that researchers in the Experiment Station hold the same basic views and perspectives as the administration and influential outside groups. Thus, there would be no basic conflict between the researcher and administration concerning the type of research to conduct. Hadwiger's (n.d.) discussion of the socialization of researchers and Bem and Bem's (n.d.) use of the unconscious ideology apply here. One researcher responded to that idea when asked whether he felt pressure to research particular topics. He

said that the Experiment Station wanted him to research whatever will get funds. Other than that he felt no pressure, probably because he and his associates were doing the research that the Experiment Station wanted. One indicator of researchers and administrators having similar research values may be seen when comparing what the researchers thought should be considered a high priority and what they thought the department and Experiment Station considered a priority.

Research priorities. The research areas seen as priorities of the administration or outside groups and individuals may not be the same areas researchers view as priorities. Whether researchers perceive that they and administrators view a specific research area as a priority is examined in this section. Hypothesis 1c states that researchers and administrators view the same areas as priorities. (No data were gathered on priority areas of outsiders.) As in most state and federal institutions, money is a necessity in the Experiment Station. As sufficient funds for all needed research are not always available, priorities are often developed.

When asking whether a stated project was a priority of the department, 31 researchers (69 percent) felt the department considered their topic a priority, while 14 (31 percent) felt that it was not a priority. The results of whether the topic should be considered a high priority of the department and whether the researcher thought it was is shown in Table 8. The results indicated that the majority of the time (84 percent)

Table 8

Whether Researcher Thought Department Should Consider Topic
A Priority by Whether It Is A Priority Of The Department

Should Project Be Considered Priority of Department	Is Project Considered Priority Of Department		
	Yes %	No %	Total %
Yes	84	50	73
No	16	50	27
Total	100 (n=31)	100 (n=14)	100 (n=45)

Chi square = 4.1

1 degree of freedom

Chi Square Significance = .04

what the researcher viewed as a priority he/she also felt the department considered a priority. The same question asked in reference to the administrators of the Experiment Station was not significant. Hypothesis 1c that researchers and administrators are likely to view the same areas as priorities is supported in terms of researchers and their department but not in terms of researchers and the Experiment Station administration. That finding is limited as the researcher was being questioned in terms of one specific project and the priority status of that project. Further, the data show only the researcher's view on whether the topic should be a priority and whether he/she felt the department/Experiment Station regarded the topic as a priority. Yet it

is important to know the impressions the researcher receives from the administration and his/her feelings about working in the land grant system. That the administration allots funds annually and that it terminates projects suggests at least some support for any active project.

Comments on that question were not so frequent as those concerning the Experiment Station. One of the common responses was that the department supported their project because they thought it was a problem. For instance, one researcher thought his topic was a priority because the problem involved was a constant complaint of citizens. Another researcher felt that his project was of great interest because the research brought money into the department. A few thought their research was not a priority and that the department would rather have the researcher work on a topic that was a priority. Other common responses included the research project not being politically popular or not a priority of the department.

When asked a similar question "Does the Experiment Station consider your topic a high priority or of great interest?", 23 researchers (43 percent) thought that it did, 17 (32 percent) felt that it was somewhat of a priority, and 5 (9 percent) thought it was not. Three of the projects not a priority were state funded, one was funded by a private source, and one by a federal agency. According to one researcher, a state funded agricultural economics project was not politically popular just as other social science research

is not popular. A state funded biology project was thought not to be a priority but as long as the researcher received funds he was able to do whatever he wanted. A researcher in horticulture and forestry stated that his state funded project was not a priority as other crops are of higher economic value to the state. An entomology researcher gave no reason why his privately funded project was not a priority. Finally, a researcher with a federally funded project in rural development found that the administration did not respond positively to applications for further research in that area.

While most of the respondents felt the Experiment Station considered their project at least somewhat of a priority, there were different explanations for those feelings. The view was expressed by one researcher that the administration was alert to problems, understood research and would stand by researchers, and that there was an expansion of research programs due to pressure from farmers. Another researcher explained that the Experiment Station did not mind what she researched as long as it brought in outside money. However, there was some feeling that they would like her to deal with problems on their list of priorities, but she thought her expertise could be applied in other areas. Another respondent stated that as long as he received outside funds he had the freedom to research whatever chemicals and diseases he wanted. Frequent responses included the idea that the research was not politically popular or not a priority of the Experiment Station. Need for the research was another

common remark. Occasional remarks centered on the administration wanting more immediate results than the present project could provide; stress on the idea of publish or perish without an emphasis on the value of the information; or that an area must be a big economic area in order to be a priority.

Researchers were also questioned on other types of research they had conducted or were conducting and the research they would like to conduct in the future. Those questions were thought to be possible indicators of whether the researcher was able to do the work he/she desired or whether other factors influenced the decision to research certain areas. Twenty (38 percent) of the researchers previously conducted or were presently conducting research in the same area as the stated research project, 10 (19 percent) had not, and 23 (44 percent) had or were currently researching a related area. When asked what type of research they would like to conduct in the future, 30 (57 percent) wanted to continue along the same lines, 19 (35 percent) wished to expand the area, 3 (6 percent) expressed the desire to research another area, and one department head stated that he may not do research in the future. Of the three researchers who wished to change their area of research, one wanted to research an area the administration at times seemed to favor, other times not. That researcher felt that his department did not have good relations with the Experiment Station administration. Another researcher was interested in research combining behavior and genetics. Not much has been done in that area.

A third researcher wanted to develop techniques to conserve energy in meat processing. Overall, it appeared that researchers were doing the type of research they desired, although a considerable proportion (36 percent) wished to expand the area.

Source and amount of funds and length of project. As funding is important to the functioning of agricultural experiment stations, it is argued that the source and amount of funds and the length of the project will influence the research. More specifically it was hypothesized: (2a) private funding groups tend to fund projects at a lower level than state or federal projects; (2b) private funding groups tend to fund short-term projects; (3a) the greater the amount of funds, the more likely the project is considered a primary area of the researcher; and (3b) long-term projects are more likely to be considered priorities of the Experiment Station than short-term projects.

In looking at the source of funds, it was found that sixteen projects (30 percent) were funded by the state legislature or state agencies, 21 projects (40 percent) by federal sources, and 16 (30 percent) by private sources. In examining the source of funds by amount of funding, it was found that 75 percent of the projects with a low level of total funds were private, and 64 percent of the private projects were in the low category. Thus, if funded by a private source, the project was more likely to be funded at a low level (Table 9). Therefore, Hypothesis 2a is supported.

Table 9
Source of Funds By Total Funds, 1971-76

Source of Funds	Total Funds During 1971-76			
	\$1 Thru \$8,000 %	\$10,000 Thru \$80,000 %	\$100,000 Thru \$1,800,000 %	Total %
State	17	41	36	33
Federal	8	35	57	35
Private	75	24	7	33
Total	100 (n=12)	100 (n=17)	100 (n=14)	100 (n=43)

Chi square = 15.6
4 degrees of freedom
Chi Square Significance = .004

The amount of funds varied greatly from project to project with \$38 as the low total and \$1,750,330 as the high total amount during 1971-76. The mean amount of total funds between 1971-76 was \$86,896, and the median was \$13,047. The low amount of average annual funding was \$38, and the high amount was \$126,205. The mean amount of average annual funding was \$23,048, and the median was \$5,950. In looking at the amount of average annual funding, private funds were found to be lower. The mean amount of average annual funds for private projects was \$3,903, and the median was \$1,795. In contrast, the mean amount of average annual funds for federal projects was \$44,529, and the median was \$30,802. For

state projects the mean was \$19,181, and the median was \$11,698.

Hightower and DeMarco (1975) argued that corporations, private individuals, or organizations donating money receive gains beyond the dollar value expended. In my study, 11 (79 percent) of the private grants had an average annual funding under \$5,000 and 3 (21 percent) had between \$5,500 and \$25,000. I talked with Dr. Leland, Assistant Director of the Experiment Station, and Dr. Mitchell, Vice President for Agriculture, and learned that if a grant is over \$5,000 a percentage of the funds is charged for overhead expenses (lights, equipment, etc.). Some negotiation may be involved if a project is at an outlying station or very specific and the funding agency will not be using University facilities such as campus buildings and the computer center. Therefore, in my study the majority of the private projects did not have overhead expenses.

Dr. Mitchell further explained that an administrator must look at the ways a project funded by a private group fits into the total research scheme. He must assess whether too many small grants looking at a specific topic will divert the researcher's attention from looking at problems with a wider importance. An example was given of small grants donated for the testing of several herbicides. If testing those chemicals will help solve a particular problem farmers are having with their crops, then those projects fit into the overall goals for Experiment Station research. If such

testing diverts the time and attention of the researcher from solving farmers' problems, then that research is not appropriate.

According to Dr. Mitchell, private groups receive more economic gain than they invested. However, the important point is whether the research they fund benefits society as a whole. That issue needs to be examined in future research.

It was hypothesized that private sources would fund projects for a shorter length of time than federal or state. Table 10 shows the length of state and private projects to be similar. Federal sources did fund a greater number of projects in the 2-5 year range but not in the long range. The source of funds does not conclusively determine the length of the project and Hypothesis 2b is not supported.

Table 10
Source of Funds by Length of Project

Source of Funds	Length of Project			Total %
	1 Year %	2-5 Years %	6-21 Years %	
State	40	19	30	28
Federal	10	63	40	42
Private	50	19	30	31
Total	100 (n=10)	101 (n=16)	100 (n=10)	100 (n=36)

Chi square = 14.9

4 degrees of freedom

Chi Square Significance = .005

The relationship between the amount of funding and whether a topic was a primary area of the researcher was examined. While data examining the selection of the topic, priorities of researchers and administrators, and desired future research were indicators of the extent researchers were conducting the research they desired, another question centered on whether the research topic was primary or secondary. Over half the researchers (29, 55 percent) stated that the research topic was primary, while 23 researchers (43 percent) considered the topic secondary. It was found that the factor of average annual funding had an effect on whether the topic was considered primary. Table 11 supports Hypothesis 3a, showing that the greater the average annual funds the more likely the topic was considered a primary area of the researcher.

While there was a significant relationship between amount of funds and a project being primary to the researcher, the length of a project was seen as relating to a project's priority status. It was hypothesized that long-term projects are more often a priority of the administration than short-term. If considered a priority area, the administration is likely to commit researchers and funds to that project and continue the project when possible.

Data received from CRIS included the year that the project began, its termination date² and the amount of funds

²The termination date refers to the year funding is scheduled to end.

Table 11

Topic Considered A Primary Area Of Researcher
Related To Average Annual Funding 1971-76

Is Research Topic A Primary Area Of Researcher	Average Annual Funding, 1971-76			
	\$1 Thru \$4,999 %	\$5,000 Thru \$25,000 %	\$26,000 Thru \$127,000 %	Total %
Yes	33	67	77	58
No	67	33	23	42
Total	100 (n=15)	100 (n=15)	100 (n=13)	100 (n=43)

Chi square = 6.1

2 degrees of freedom

Chi Square Significance = .05

received each year. The year that projects began ranged from 1949 to 1976. Termination dates went from 1970 to 1981. Seventeen projects did not have a starting year listed, ten had only a termination date. The length of the projects ranged from 1 to 21 years with a mean of 5.7 years. According to the CRIS report, of the 43 projects on which data were given, only 12 had not yet reached their termination date. The discrepancy between the termination date and the researchers' statements appeared because many of the projects did not end at their expected termination date. Further, the data from CRIS covered 1971-76, therefore, some of the projects whose funding began in 1970 or ended in 1976 were not included.

The length of the project proved to be a significant factor on whether the project was considered a priority of the Experiment Station. If a project was a year in length, it was more likely not to be considered a priority of the Experiment Station than if it was a longer term project (see Table 12). Hypothesis 3b that long term projects are more likely priorities of the Experiment Station is supported. The shorter the project, the less likely the researcher thought it should be a priority of the Experiment Station (see Table 13). It seems logical that projects with the most resources invested in them would be considered high priorities.

Pressures. The existence of pressure within the Experiment Station and how the degree of pressure was affected by variables such as length of project and the source of funds was explored. In general, it was hypothesized (1d) that the majority of researchers would not experience pressure from the administration or outside groups and individuals. If researchers and the administration hold similar views, little pressure needs to be exerted, as it is likely researchers are conducting the research desired by administrators and outsiders. Further, it was hypothesized that researchers conducting privately funded projects would experience more pressure than those conducting state or federally funded projects (Hypothesis 2d). It was also hypothesized (3c) that the higher the funds, the more pressure a researcher would experience. Finally, it was hypothesized that researchers conducting long-term projects would experience more pressure

Table 12

Whether Researcher Thought Project Was a Priority
of Experiment Station by Length of Project

Whether Project Is a Priority of Experiment Station	Length of Project			Total %
	1 Year %	2-5 Years %	6-21 Years %	
Yes	0	60	63	45
No	100	40	38	55
Total	100 (n=8)	100 (n=15)	101 (n=8)	100 (n=31)

Chi square = 8.9

2 degrees of freedom

Chi Square Significance = .01

Table 13

Whether Researcher Thought the Experiment Station Should
Consider Project a Priority by Length of Project

Should Project Be Considered Priority of Experiment Station	Length of Project			Total %
	1 Year %	2-5 Years %	6-21 Years %	
Yes	25	79	100	74
No	75	21	0	26
Total	100 (n=4)	100 (n=14)	100 (n=5)	100 (n=23)

Chi square = 6.9

2 degrees of freedom

Chi Square Significance = .03

than those conducting short-term projects (Hypothesis 3d).

When asked whether they "experienced any pressure by the Experiment Station, . . . department, colleagues, or others to research particular topics," 22 researchers (42 percent) said yes they had, while 31 (59 percent) felt no pressure. In looking at pressure not to research particular topics, 16 (30 percent) stated they had experienced this pressure while 37 (70 percent) felt no pressure. The source of pressure came almost equally from inside and outside the Experiment Station. Of those reporting pressure, 8 (50 percent) stated that the Experiment Station, department, or both were the source, while 6 (38 percent) experienced pressure from outside organizations or individuals. One individual (6 percent) felt pressure from both the Experiment Station and the legislature. One researcher (6 percent) did not state from whom he/she experienced pressure. Twenty-six (49 percent) experienced no pressure. In looking at whether researchers felt pressure either to research particular topics or not to research particular topics, 25 (48 percent) felt pressure and 28 (52 percent) did not experience any pressure. As the number of researchers in each category was almost equal, Hypothesis 1d that the majority of the researchers would not feel pressure is not supported.

Of those experiencing pressure, many felt pressure to research a specific topic or get certain data. Several researchers further elaborated on the type of pressure they experienced. For instance, one researcher stated that he

was not pressured by the Experiment Station or his department to do particular research. If that were the case, he would have resisted. He continued to explain that pressure from outside groups and money interests were present, but he resisted, and resented them, and would continue the research he thinks is important, while presenting the results he finds. Other comments throughout the interviews touched on the issue of funding. According to one researcher, the Experiment Station had limited funds, and thus it was a necessity that researchers conduct the research that would get outside funds. Researchers were also encouraged through funding to research certain topics. The comment was made that people distort grant objectives in order to get funded.

Researchers expressed less pressure not to research particular topics. The most frequent form of pressure was the administration telling the researcher to set the project aside. A couple of researchers were unable to publish the work they had conducted, in one case because it might upset some county government people. One researcher's project was closed by the administration because an outside organization wanted results which the research did not provide and wanted the researcher to support and promote its programs. Steps taken in the research were illustrated to representatives of the organization who agreed with each step but did not like the results. So the representatives thought the research was not done right. Research in that area was assigned to inexperienced personnel and was influenced for a

period of time by the outside organization. The administration did not discuss the matter with the original researcher.

The source and amount of funds and the length of the project was thought to influence the amount of pressure a researcher experienced. It was hypothesized that researchers conducting privately funded projects would experience more pressure than those conducting state or federally funded projects (Hypothesis 2d). It was also hypothesized (3c) that the higher the funds, the more pressure a researcher would experience. Finally, researchers conducting long-term projects were thought to feel more pressure than those conducting short-term projects (Hypothesis 3d). Unfortunately, the data concerning pressure experienced and the information on the source and amount of funds and length of project were not comparable. Researchers were asked if they experienced pressure while conducting any of their research projects. On the other hand, the information on the source and amount of funds and the length of the project related to a specific project. As there was no information on whether the researcher experienced pressure on a stated project, the data were not comparable. Therefore, no conclusion can be drawn concerning the influence of the source and amount of funds and the length of the project on the amount of pressure experienced by a researcher (Hypothesis 2d, 3c, and 3d not supported).

The question of whether the respondent knew of other researchers who felt pressure to research particular topics was not asked but several researchers commented on it. Six

researchers stated that they knew of others who had felt pressure to research particular topics, and one respondent stated that he knew of someone who had been pressured indirectly. One researcher was told to change the direction of the project, another to do a specific problem, and a third, felt indirect pressure through funding. The pressure came from the Experiment Station on two occasions and the funding agency once. It was further reported that two researchers knew of others who felt pressure not to research particular topics. The nature of the pressure and by whom was not stated. This indirect knowledge of pressure serves as a demonstration effect for those who might be tempted to research new unpopular areas.

Research beneficiaries. The responses to the question of who will benefit from the researcher's project were numerous. They could be divided into two general categories with various combinations. One category consisted of responses that included farmers and/or consumers (36 responses, 68 percent), and the second group (14, 26 percent) consisted of the response that industry and/or other groups were beneficiaries.

Responses to why certain people or groups would benefit from a project formed a wide range. Frequent responses centered around the various ways in which the farmer, consumer, or specific industry would benefit. General responses were also made such as the statement that the research was intended to make life better either in a material or intangible manner. Several of the research projects were basic, and thus,

researchers felt they might not have immediate results.

Among the other remarks, two are further described. One researcher explained that research cannot always be designed to actually benefit certain people. He further stated that even if research has potential benefits, no research design can force people to use the knowledge. Extension can educate but cannot make people use the information.

Another researcher felt that the results of his project were not for the people whom they had intended -- the farmer. The administration tends to go where there is money. Where they can get funds dictates what gets done. As a result, research may be in the best interests of the company rather than the Experiment Station. He tried to give the information from his project to farmers first, and then the "hungry wolves" could have it.

When asked "Is enough research on the topic of this project being conducted?", 21 researchers (39 percent) said yes there was enough and 30 (57 percent) said that there was not enough research on the topic because there was a continuing demand for the information or too little had been done. For instance, one researcher stated that most research on a certain problem was based on urban people, while there was a need for data based on rural people in order to meet their needs. Another common remark was that not enough research had been done on a topic because funding was lacking. Others felt that there was enough because similar research was being done elsewhere or because the problem was solved.

Nearly half the researchers (26, 49 percent) felt that the research they saw as vital in the future would be funded or that it was already being funded. Four others (8 percent) thought that some needed research would be funded while other areas would not. Another 4 researchers (8 percent) stated that research was funded but only at a minimal level. Nine researchers (17 percent) were pessimistic about the funding of a desired area. Nine others (17 percent) did not know the probability of the funding of a vital project.

In response to whether there were any vital topics of research they would like to see funded in the future, the comments centered around too little being done in the area, the difficulty of getting funding or acceptance of the research by the administration, and the administration considering the topic important. The following remarks are representative of the various opinions. Remarks varied greatly with few common responses. Several researchers felt that the social aspects of research problems were not considered a high priority. It was further explained that the administration was quite narrow in what they funded and traditionally have leaned towards agricultural research. An ancillary research agency is needed that would fund rural research if the Experiment Station does not want to conduct this research. Two other responses expressed views opposing each other. When speaking about future research, one researcher was interested in water quantity more than water quality and in conservation. He felt that the director of the Experiment Station was aware

of the problems and was looking at what could be done. Another researcher stated that he is interested in what we are doing to our land. He felt that he was supposed to be concerned with other things, but he has seen erosion happening and is concerned.

In speaking about the probability of research getting funded, one respondent replied that the director experiences a lot of pressure to get certain problems solved. He may not always look at the total picture and problems in the long run. There is a need to look outside of Kansas and to the whole world to find answers. The need for food is vital; meat may eventually become too expensive. Thus, alternatives such as a high protein variety of corn are very important.

Other studies examining the land grant system have assessed the ability of the system to fill the needs of farmers and consumers. Several questions in this study were asked concerning that issue. Responses to one such question, "In your opinion are the needs of all Kansans including small farmers, consumers, and small town residents, being served by the Kansas State University land grant system?" were divided. While 22 researchers (42 percent) thought the land grant system was meeting all needs, 24 (45 percent) thought some of the needs were not met or that improvements could be made. Only two researchers (4 percent) directly stated that needs were not being met overall.

Of those who felt some needs were not being met by the land grant system, 12 researchers (23 percent) thought

the needs of small and organic farmers, migrant workers, small town and rural people, or those not already knowledgeable and without political influence were not served as well as they could be. Three (6 percent) felt that more could be done for urban people, one (2 percent) cited the specific area of sociology and another (2 percent) stated that the area of production research was lacking. Two researchers (4 percent) felt needs were not being met but did not state a specific area. In nine cases (17 percent) no data was provided. The comment on the needs of production agriculture not being fulfilled was an atypical response. Of the others who perceived needs not being met, no one mentioned large farmers or agribusiness. Those who felt the land grant system was not fulfilling needs had projects in the following areas: Agricultural Economics (four researchers), Soil and Water (one), Plant Science (six), Animals and Animal Feeds (one), Agricultural Engineering (two), Food Science (two), and Other Basic (two).

More researchers seemed to elaborate on the question of whether needs were being fulfilled than on any other. Only a few of the responses showing the range of attitudes are described here. Many researchers stated that the land grant system was aiding farmers and providing inexpensive food. One researcher stated that the land grant system does fill needs, although there are arguments to the contrary such as when migrant workers are displaced by mechanical crop pickers, etc. This country produces food better than any

other country in the world due to the land grant system - it is a "tremendous success." The idea was also expressed that without the Experiment Station some farmers would be in bad shape. New breeds or varieties and increased efficiency help both large and small farmers. Without the Experiment Station, only the largest farmers could survive. Less frequent expressions of how the land grant system was fulfilling needs included the following. As everything published is free and available to all, a researcher thought the land grant system had fulfilled needs. Another response was made that in general needs were met although "the wheel that squeaks gets the most grease." Organized groups such as the Kansas Livestock Association were given as an example. Finally, one researcher had seen a change from the past emphasis on large and commercial aspects to the movement in the last five years towards those with limited resources and small operations.

The comments on the manner in which the system was not fulfilling needs were also varied. Many of the remarks concerned the feeling that the needs of small farmers and those without economic or political power were not filled. Following are examples of those feelings. One response was that the land grant system catered to pressure groups. Another researcher explained that he was disappointed that the Experiment Station administration did not see a need to get into new areas. He also recognized areas not served. Special population and socioeconomically deprived groups such

as blacks, Mexican Americans, and old people were not being helped. There is a tremendous need yet the Experiment Station does not seem to serve them, while the middle and upper classes and the general farm population is served. In answering that the system did not serve all needs, one respondent further explained that research and extension tend to serve larger farmers. There is not an integrated approach to problems. There is a need to shift from the emphasis on improving breeds and varieties to an integrated approach to the development of small communities and small farmers; more research on organic agriculture is essential.

Of those responding to the question, "Are there certain areas of research that are strongly overemphasized by the Experiment Station or your department?" 12 (23 percent) felt that an area was overemphasized, and 20 (39 percent) thought there were no areas overemphasized. Further, in the latter category, three researchers felt that all areas were underemphasized. Those responses were in contrast to those concerning areas overemphasized by the department. Only 5 (9 percent) stated that there were areas overemphasized by their department, while 30 (57 percent) thought there were no areas overemphasized. Nine researchers (15 percent) thought an area was overemphasized but did not state whether it was by the Experiment Station or department.

While the remarks on overemphasized area varied greatly, a few are discussed. Several respondents felt that production agriculture or agribusiness was overemphasized.

One researcher stated that much of the research was sterile and based on old, economic assumptions. Another remarked that it would be "okay" to have such an emphasis on production agriculture, if there was also enough money to spend on the development of small communities and small and organic farms. On the other hand, there was the view by one researcher that it was easier to get funded if not in agriculture but in another field funded by the Experiment Station. Another researcher felt that many of the National Institute of Health and National Science Foundation grants that people applied for were irrelevant to Kansas, such as the study of jellyfish in Chesapeake Bay. Finally, one researcher stated that funds were dispensed in the Experiment Station, at times, on the basis of personality.

Links with outside organizations. Knowledge of outside ties is important, as it hints at sources of potential influence. According to Watson et al. (1972:39), by discovering what relationships an institution favors, we begin to count those which it regulates to unimportance." To examine the links that researchers had with outside organizations, a series of questions focused on involvement by researchers on boards of directors and with consulting. Only one researcher stated that he had been on a board of directors of a corporation. He is no longer on the board and did not specify which corporation or whether it was agriculturally related or nonrelated. Five people reported past participation on boards of agricultural interest groups, with three reporting current

participation. Groups included the Kansas Heart Association, Kansas Crop Improvement Association, National Swine Association, and the Milling Association, Food Protection and Sanitation Commission. Two researchers stated that they currently were advisors to agricultural interest groups, one to the National Swine Association, the other not stated. Participation with outside organizations in that manner was either under-reported or uncommon. Ties to outside organizations could affect the type of research conducted. Barry Flinchbaugh, special assistant to the president and public affairs extension economist, stated that it was possible to be an officer of a private farm organization without having its policy affect you but "it is difficult" (Collegian, 1977:1).

Activity in the area of consulting was more frequent than membership on boards of directors. Thirteen researchers (25 percent) stated that they had consulted with a corporation in the past. Six (11 percent) reported that they were currently consulting with a corporation. Only three (6 percent) stated that they had consulted with an agricultural interest group, while no one reported currently consulting with such a group. Seven researchers (13 percent) reported having consulted with a government group, with no one currently consulting. Many researchers had consulted but did not state with whom. Eighteen researchers (34 percent) had consulted with an unstated group (or in a couple of cases a group unrelated to the other categories). Six researchers (11 percent) were currently consulting in that manner. Of

the researchers who reported previously or presently consulting, nine (17 percent) had consulted with more than one group. Thirty-five researchers (66 percent) had or were consulting with a group. The private groups with which researchers had consulted included: the equine industry, a small group of people who requested it, Mobile Oil, veterinarians, a packing plant, Oak Ridge Laboratory, a corporation involved with NASA, Upjohn, and Gulf and Western. Government groups included: Electrical Power Research Institute and the Department of Justice. Foundations and research institutes included: International Biological Program, Midwest Research Institute, Nebraska National Cancer Institute and National Science Foundation. Many respondents did not state with whom they had consulted.

Several researchers made random comments about the ethics of doing consulting. One researcher did not believe in consulting. Further, if paid by the State of Kansas a researcher should not do consulting for Kansas firms or corporations as it took research time away from other Kansas taxpayers. Two researchers believed that consulting should be on a free basis with information given to anyone who wanted it. Another researcher stated that he tried to keep consulting to a minimum. Other comments were made by a researcher who did little consulting because of a lack of time, and another who thought it was nice to have someone request his services and so his consulting was not just for money.

Experiment station support. Another example of a link between the University and outside groups is the Kansas Council on Agricultural Research and Education, commonly referred to as the Agricultural Advisory Council.³ The Council is composed of various commodity and interest groups from the state of Kansas. According to Roger Mitchell, Vice President for Agriculture, two representatives from the large groups and one from the small groups act as liaisons between their organization and the university. These representatives meet with the Vice President for Agriculture and other University administrators once and sometimes twice a year. The University receives input on the needs of these groups at the meetings. The representatives take information back to their groups and may later present their needs to the state legislature.

In response to the question "Why do you think the Experiment Station supports this project?" 29 researchers (55 percent) felt that it was because of the importance of or

³The Council is composed of the following organizations: Agricultural Communications, Formula Feed Industry, Kansas Association of Bank Agricultural Representatives, Kansas Association of Soil Conservation Districts, Kansas Co-op Council, Kansas Crop Improvement Association, Kansas Extension Advisory Council, Kansas Extension Homemakers Council, Kansas Feed and Grain Dealers Association, Kansas Irrigation and Water Resources Association, Kansas Inter-Breed Dairy Council, Kansas Livestock Association, Kansas Pork Producers Council, Kansas Poultry Association, Kansas State Horticultural Society, Kansas Soybean Association, Kansas Veterinary Medical Association, Kansas Wheat Growers Association, and Milling Industry.

need for the research. Another 20 (38 percent) believed that the Experiment Station supported the project because it brought in money and the Experiment Station was not financially supporting it. While the most frequent responses are categorized into need for the results or importance of funding, a few of the individual remarks are further explained. One aspect was shown by a researcher who felt that the administration was flexible and tried to support researchers in their work. Various other responses elaborated on the need for the research and its significance. Concerning a research project with funds earmarked for social research, before the Rural Development Act was developed, one researcher's proposal was the only one submitted that year so his project was accepted. A common remark was that the Experiment Station was not financially supporting the project or supported it because it brought in money. One researcher further stated that the Experiment Station would get a percentage of the overhead and that the research was a means of prestige. Again researchers perceived outside funds to be important to the continued operation of the Experiment Station.

Future research. In speaking about their research in the future, many of the researchers spoke of their goals and of some of the problems they were encountering in attaining those goals. Funding was mentioned frequently as a difficulty. For instance, one researcher spoke of the necessity for setting up priorities and spreading the money around, and another spoke of the problems of writing proposals

to meet the expectations of various funding agencies in order to receive funds for the project. In an attempt to get a rural development project funded through the Experiment Station, several stages faced one researcher. First, the Experiment Station was very excited about the proposal, then they said that they were unable to fund it completely. If the researcher would get half of the funds elsewhere, they would provide the other half. After awhile, it was decided that funds were too tight, and the Experiment Station could not fund it at all. He feels that the Experiment Station is more concerned with agricultural problems (i.e., how far apart to plant each corn row) than with rural research. If money is not tight or if research is earmarked for social research, then projects such as his will get funded. Otherwise social research projects are not seen as a high priority. In contrast, another researcher spoke of the Kansas State Agricultural Experiment Station as being somewhat progressive compared to other experiment stations. At Kansas State there is an emphasis on including departments besides agriculture such as engineering, biology, psychology, political science, and all home economics departments. Finally, in talking about the past, one researcher mentioned that in the late 1940's and early 1950's, his work on solar energy and other energy saving research was not of great interest to many others because energy was cheap. Now there is more interest, but it is still discouraging.

Chapter 4

SUMMARY AND CONCLUSIONS

Summary

The open systems model emphasizes the interaction between an organization and its environment. Thus, this thesis examined the historical background of the land grant system, the researchers' perception of their role in the experiment station, and the pressures experiment stations perceive from outside groups. The discussion of the historical background of the land grant system provided a framework for understanding the development of agricultural experiment stations, their emphasis on productivity and technology, and their tendency to serve conservative rather than radical agrarians.

Other elements in the analysis of experiment stations included the interaction of researchers with outside funding groups. This analysis was limited to researchers' perceptions of their role in the land grant system, their perception of pressure, and the researchers' evaluation of priorities and needs. The influence of the source and amount of funding and length of the project on those variables was also examined.

Background data on the interview sample showed that the number and percentage of projects in the areas of rural development and social science were the smallest of all areas investigated. Further, the amount of funds for those

groups were also the smallest. That data followed Hadwiger's argument that rural development and social science are given only a small proportion of land grant university research resources.

To assess the educational background of researchers and the freedom they have to develop research projects, data were gathered on researchers' educational background, who selected research topics, and the priority status of specific research projects according to the researchers' perceptions of administration views. It was found that the majority of researchers in the Experiment Station held a Ph.D. and were educated in a land grant university. In general, researchers initiated their research topics rather than conducting research stipulated by the funding source or other outside organizations. Interview questions focused on whether a specific project was a priority of the administration and whether researchers thought it should be a priority. It was found that if the researcher felt a project should be considered a priority of the department, it was also likely the researcher felt the department considered the project a priority. The hypothesis that researchers and administrators have the same priorities was supported in terms of department administration but not in terms of Experiment Station administrators. That finding was limited as it involved researchers' perceptions concerning a specific project and whether the department and Experiment Station considered it a priority.

The source and amount of funds and length of the

project were found to influence variables related to research. In examining the source of funds it was shown that privately funded projects had lower funds than state or federally funded projects. The source of funds was also examined by the length of the project. The length of state and private projects were similar. Federal sources funded a greater number of projects in the medium range but not in the long range. The sources of funding for long range projects was divided almost equally between state, federal and private funding groups. Thus, the source of funds does not conclusively determine the length of the project.

The amount of funding was related to a project being considered a primary area of the researcher. It was found that the greater the average annual funds the more likely the topic was considered a primary area of the researcher. The length of the project also proved to be a significant factor on whether the project was considered to be a priority of the Experiment Station. Long-term projects were more likely priorities of the Experiment Station. According to information from the Research Foundation, individuals or groups donating funds are not given a priority to receive a patent for research.

The perceptions of pressure experienced by researchers were examined. Nearly half of the researchers expressed either pressure to research particular topics or to not research particular topics. It was hypothesized that the source and amount of funds and the length of the project

would affect the amount of pressure a researcher experienced. Unfortunately, the data concerning pressure experienced and the information on the source and amount of funds and length of the project were not comparable. Researchers were asked if they experienced pressure while conducting any of their research projects rather than pressure on a specific project. On the other hand, the information on the source and amount of funds and the length of the project related to a specific project. As there was no information on whether the researcher experienced pressure on a stated project, the data were not comparable. Therefore, no conclusion can be drawn concerning the influence of the source and amount of funds and the length of the project on the amount of pressure experienced by a researcher.

It is difficult to assess the extent to which agricultural experiment stations are influenced by pressures from those who provide funds or who have the potential to influence funding sources. One indicator that hints at potential influence involves the links researchers have with outside organizations and individuals. Participating on a board of directors of agriculturally related groups or consulting with outside groups are examples of the linkages researchers may have with outside influences. In this study, few researchers stated that they were members of boards of directors of agriculturally related groups. Over half the researchers (35, 66 percent) had consulted or were consulting with a group outside the University. Again it is hard to know the extent

which belonging on a board of directors or consulting with an outside group influences the type of research conducted. Yet, such close communication could inform researchers of the research needs of those groups, while the needs of a small farmer with no contact may remain unknown.

Involvement in outside organizations is encouraged by the Experiment Station in the form of obtaining financial support. Suggestions of that tendency were found in the responses to the question of why the Experiment Station supported the researcher's project. As mentioned 38 percent of the researchers claimed that the Experiment Station supported the project because it brought in outside funds.

Conclusions

Throughout its development, the land grant system has emphasized the use of technology and efficiency in terms of least cost per unit. This emphasis influenced its ties with outside groups as the land grant system was more suited to serve conservative agriculturalists who sought improvements through technology than radical agrarians who sought change through political means. According to Hadwiger (n.d.) and Hightower and DeMarco (1975) the ties of the land grant university to outside groups influences the values of researchers within experiment stations. The values researchers hold affect their selection of research projects. According to Hadwiger (1975:37), agricultural researchers receive funds for projects with vague titles that seem to allow researchers

the freedom to develop the topic. Thus, project selection appears to be a decentralized activity. Yet, research selection is constrained if researchers have adopted the values and goals of the land grant system and influential outside groups and if researchers' career development depends on the acceptance of those values and goals.

Data from this study did not adequately measure neither the research values and goals of agricultural researchers, land grant administrators, and outside groups nor whether or not these factions held similar values and goals. The interview schedule centered on the researchers' perception of the factors influencing the selection of research topics. One question touching on the research asked whether or not specific projects were priorities of both researchers and administrators. In general, if the researcher believed a project should be a priority of the department, the researcher also thought the department considered the project a priority. This finding, while significant, for researchers and department administrators, did not hold for researchers and Experiment Station administrators. The information gathered from this study needs to be expanded with further knowledge of research priorities and the criteria used to develop the priorities.

Hadwiger (n.d.) viewed the educational background of researchers as a factor leading to the socialization of researchers into the land grant system. It was found that the majority of researchers in this sample at Kansas State received

at least one degree from a land grant university. Education is only one aspect of the socialization process. According to Friedland (1978), researchers learn through their own or colleagues' experiences that some types of research are more likely to be published than other types. Such knowledge shapes a researchers selection of researchable projects. Therefore, while researchers at Kansas State Agricultural Experiment Station selected their project topics, their selections are likely to be influenced by knowledge of what will be funded and possibly published.

While researchers selected their project topics, other factors affected the research situation. For instance, funding represented an outside influence on the research that was conducted. Funding agencies have the power to limit or withhold their monies from the university. Funding is necessary as it allows the land grant system to function with inputs of funds, personnel, and other resources; production of products and information in the system; and distribution of those products to the outside environment. Although the data were limited in several areas, the source and amount of funds and length of project emerged as factors related with other variables such as the priority status of a project and whether a project was a primary area of the researcher.

In looking at the source of funds, it was found that privately funded projects were funded at a lower level than state or federal projects. That finding follows Hightower and DeMarco's (1975) argument that private groups give minimal

funds while receiving more than they invested. It is difficult to assess the economic return to private groups. Besides looking at the funds given by a group to pay for a project, it is important to know the costs a group does not have to pay. The majority of privately funded projects did not have overhead expenses as those funds were under \$5,000. Thus, a private group donating a low amount of funds received to some extent the services of staff and equipment already paid by the state.

According to Hightower and DeMarco (1975), private funding sources particularly corporations are given preferential treatment at some universities in getting a patent of research results. At Kansas State University, corporations are not given priority in getting a patent. According to Murry (1975), contracts may stipulate who owns potential patent rights. However, a private contractor must pay all of the costs of research, both direct and indirect, including such items as the salary of researchers and other staff and the cost of equipment.

Concerning the amount of funds, it was found that the greater the amount of funds, the more likely the researcher considered the project a primary area. Areas of primary concern to researchers are likely to be areas in which they specialize. Therefore, it would be beneficial to funding agencies and the administration to delegate the greatest amount of funds to research areas in which a researcher specializes.

The length of the project proved to be related to whether or not a project was a priority of the Experiment Station. It was found that the longer the project, the more likely it was a priority. If an area is a priority, the administration probably will attempt to continue research in that area.

It was hypothesized that the source and amount of funds and the length of the project would affect the amount of pressure a researcher experienced. Nearly half the researchers expressed feeling some pressure to either research or to not research a particular topic. It was hypothesized that the source and amount of funds and the length of the project would affect the amount of pressure a researcher experienced. However, the data concerning pressure experienced and the information on the source and amount of funds and the length of the project were not comparable. Researchers were asked if they experienced pressure while conducting any of their projects rather than on a specific project. On the other hand, the information on the source and amount of funds and the length of the project related to a specific project. Thus, again the data were not comparable, and no conclusions can be drawn concerning the influence of the source and amount of funds and the length of the project on the amount of pressure experienced by a researcher.

The data in this study relied heavily on the perceptions of the researchers. Knowing whether or not responses to questions of judgment accurately portray the situation is

difficult. For instance, can questioning researchers about the pressure they experience actually measure that pressure? Each respondent may define pressure differently, some may not recognize the existence of pressure, and others may not report it even if recognized. Whether researchers feel free to express the pressures and constraints they experience is an important issue. A number of respondents questioned the degree to which confidentiality would be maintained. On several occasions, a researcher would request that certain remarks made during an interview remain confidential. On the other hand, some respondents stated that they did not care if the administration found out what they thought. Similar difficulties are involved in other questions demanding that researchers assess a situation, such as the question concerning whose needs were met by the land grant system.

Little work exists on the decision-making processes leading to the selection of research, particularly using a framework such as the open systems model. The work conducted here hints at the knowledge to be gained from that model with its emphasis on understanding both the internal environment of the land grant system and its linkages with influential outside groups or individuals. The many areas of needed research and the questions they raise are discussed in the next section.

Areas of Future Research

As this thesis was exploratory, several problems were

encountered in the gathering and analysis of data which might be avoided in future research. For instance, the small sample of researchers limited the statistical analyses. Because all of the interview questions were not relevant to all the researchers, cross-tabular data analysis and skewed answer distribution yielded a number of empty cells and cells without adequate cases to interpret properly. Information from CRIS on the amount of funding and the length of the project was complete on only 43 of the 51 cases, further restricting usable data. As a result of the exploratory nature of the study, the interview questions were insufficient to measure the process of researcher socialization into the land grant system.

The open systems approach requires that the analysis of the Experiment Station involve an examination of the interaction of outside organizations with the Experiment Station. As the major portion of this thesis centered on the researcher's role in and perception of the land grant system, other aspects of the organization-environment need to be analyzed. One area for future research is the influence of outside organizations or individuals on the selection of research. What are the formal and informal linkages between corporations, agribusiness, influential farm organizations, the Agricultural Advisory Board, and the Experiment Station? The role of the land grant administration in the functioning of universities is another research need. Do administrators experience pressure from outside groups or individuals? If so, how do

they handle that pressure? How are research priorities developed? What is the extent to which research priorities are shaped by the demands of the state and federal government and by influential outside groups? Another basic area to be researched is the process by which research results are disseminated by the Extension Service. What segments of the population receive research information and how well does the current research fill their needs?

An in-depth understanding of the decision-making process by which research topics are selected is imperative. Along with that knowledge is the necessity of recognizing the segments of the population that the land grant system is serving and those it fails to serve. With knowledge of the factors influencing research selection and an assessment of research needs and beneficiaries, the land grant system can renew and redirect its efforts where needed to further serve the people.

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APPENDICES

APPENDIX A
TYPES OF RESEARCH UNDER RPA "RURAL HOUSING"

TYPES OF RESEARCH UNDER RPA "RURAL HOUSING"
 BY CSRS AND USDA, CALENDAR 1970*

	<u>No. of projects</u>	<u>Man-years</u>
<u>Madden Public Policy Categories</u>		
1. Situation	12	6.6
2. Causes	15	4.4
3. Current Programs	1	0.0
4. Innovations	4	.7
5. Synthesis of Findings	2	.6
6. Communication to Decision Makers	2	.5
Subtotal	36	12.8
<u>Technical Findings</u>		
7. Construction	15	39.6
8. Parasites	6	12.0
9. Maintenance	3	1.2
Subtotal	24	52.8

*Derived from information in annual progress reports.
 (Hadwiger as in Hearings, 1972:2821)

Specific Findings, 1970

Below is a list of major findings of rural housing re-search projects. For each project reporting findings, an effort was made to extract the findings most emphasized. These appear in abbreviated form below, listed in the order in which projects appeared.

Better house designs
 Amount of electricity used in farm houses
 Relationship between SES, credits, demographic, ownership, and quality of rural housing
 Termite behavior, migration
 Ways to reduce housing construction costs
 Little mortgage credit is available in rural Arkansas
 Substandard houses are inhabited by old or disabled or women; and mobile homes are a major supplier of low-income housing
 Strength of glue
 Durability of wood finishes
 Fire resistant material was uneconomical
 Effectiveness of wood preservatives
 Engineering values for strength of wood paneling
 Need adequate anchorage for wood beams
 Sandwich panels perform well
 Financial management practices are related to housing conditions
 Technique of building concrete blocks without mortar
 A method of assessing consumer preferences for housing
 Physical aspects of housing needs for elderly
 Floor surface wear is reduced after a time
 Elderly did not prefer public housing over other forms, and use of public facilities was determined by proximity
 Difficulty of homemaking tasks is related to housing
 Employed homemakers have less time for housekeeping tasks than nonemployed homemakers
 There are differences between rural and urban in completion of housing tasks

Sound does not unduly penetrate wood frame walls
Low cost home design
Use of new nails, new glue and preventing decay of wood
Operations research can help forest products industry
Behavior of termites
Bacteria deterioration of wood
Conditions and remedies for problems of low-income housing
Housing status is related to SES, housing meanings, social participation
Urban-rural differences are related to fertility rates
Size of families and income of rural families
How much does a home cost the community, and how much does the community receive from taxes (community cost for residence versus community income from taxes)
Heat and radiation varies specifically with size and position of wall openings.

(Hadwiger, Hearings, 1972:2822)

APPENDIX B

CODE SHEET FOR THE CLASSIFICATION OF RESEARCH PROJECTS BY
SOURCE OF FUNDS

State Funds 01-09

- 01 - State, no other specification
- 02 - Kansas Department of Economic Development
- 03 - Kansas Forestry, Fish and Game Commission
- 04 - Branch Station Fees, State
- 05 - Branch Station Fees, only
- 06 - Kansas Water Resources Board
- 07 - Kansas State Division of State Planning and Research
- 08 - Other Kansas Universities
- 09 - Other State

Federal Funds 10-25

- 10 - U.S. Atomic Energy Commission
- 11 - USDA-ERS
- 12 - Army Corps of Engineers (Energy Research and Development Administration)
- 13 - USDA-ARS
- 14 - USDA - Consumer Marketing Service
- 15 - Environmental Protection Agency
- 16 - McIntire-Stennis
- 17 - USDA-OWRR
- 18 - AID
- 19 - Other Land-Grant Universities
- 20 - Health, Education, and Welfare
- 21 - Department of Army or Army Research Office
- 22 - Food and Drug Administration
- 23 - Other USDA
- 24 - Federal Energy Commission
- 25 - Other Federal

Federal-State Funds

- 26 - State--Hatch
- 27 - Hatch--RRF--State
- 28 - McIntire-Stennis--State
- 29 - RRF--State
- 30 - Other

31 - Private Funds32 - Foundations, Research Institutes33 - Agricultural Interest Groups and Associations34 - Others

APPENDIX C

INTERVIEW SCHEDULE, LETTER OF INTRODUCTION AND CONSENT FORM

1. Where did you receive your Ph.D. or your final degree and what area was the degree in?
2. What were the subject areas of your thesis and dissertation?

Thesis

Dissertation

3. Research project selected --
4. What were the criteria used in determining the topic of your project?
5. Was the topic: initiated by you or by others such as the department head or outside organizations (please specify).
6. If project topic was initiated by you, did you first have a project in mind for which you sought funds, or were funds available after which you chose a project topic?
7. What was the source of funds?

8. If the project idea was initiated by others, to what degree was the topic the researcher's own?
- Funds were available so long as the researcher would research a specified topic.
 - Funds were available, the researcher was given the opportunity to develop his/her own topic but departmental priorities were stressed.
 - Funds were available and the researcher was given the opportunity to develop his/her own topic as desired.
 - Other (specify).
9. Do you feel that the topic of your research project should be a high priority of the department?

Of the KSU Agricultural Experiment Station?

10. Does the department consider your topic a high priority or of great interest?

And the Experiment Station?

11. At this time would you consider the subject area of your project to be of primary or secondary concern to you? Why?

12. Is enough research on the topic of this research being conducted? Too much? About right?

13. Are there any vital topics or areas of research that you would like to see funded in the future? What is the probability that they will be funded?

14. Who will benefit from your present research project?

15. In your opinion, are the needs of all Kansans, including small farmers, consumers, and small town residents, being served by the KSU land grant system? Explain.

16. Are there certain areas of research that are strongly over-emphasized by the experiment station or your department?

17. Have you experienced any pressure by the experiment station, your department, colleagues, or others to research particular topics? Explain.

18. Have you experienced any pressure by the experiment station, your department, colleagues, or others not to research particular topics? Explain.

19. Have you sat on a board of directors of a corporation? Are you currently sitting on a board of directors? If so, please specify.

20. Have you previously sat on a board of directors of an agricultural interest group? Currently? Please specify.

21. Have you previously acted as a consultant for a corporation or agricultural interest group? Are you currently working in this capacity? Please specify.

22. In granting support (financial or otherwise) to your project do you think the experiment station had a strong hypothesis as to the results? If so, explain. (Question not used).

23. Why do you think the experiment station supports this project?

24. What are other types of research have you previously conducted or are presently conducting?
25. What type of research would you like to conduct in the future?

Vice-President for Agriculture, Waters Hall 114, Phone: 913 532-6147
Dean, College of Agriculture, Waters Hall 117, Phone: 913 532-6151
Director, Agricultural Experiment Station, Waters Hall 113, Phone: 913 532-6147
Director, International Agricultural Programs, Waters Hall 14, Phone: 913 532-5714
Director, Kansas Extension Service, Umberger Hall 122, Phone: 913 532-5820
Manhattan, Kansas 66506

August 30, 1977

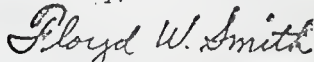
TO WHOM IT MAY CONCERN:

This is to advise you that Ms. Karen Schwartz, graduate student in the Department of Sociology and Anthropology, is engaged in the collection of data needed for the completion of a Master of Science degree in that department.

This pursuit of data is being done with our knowledge. In this endeavor and others Ms. Schwartz has kept us informed of activities. Since these data are desired for the completion of her M.S. research, your consideration of her questions will be much appreciated.

Thank you.

Sincerely,



Floyd W. Smith, Director
Agricultural Experiment Station

Informed Consent

In this interview we will be asking you questions related to your professional interests and the research you have conducted or are presently conducting. We are particularly interested in the methods by which topics of research in the agricultural experiment station are selected. I plan to use this information for educational purposes while working on my Master's thesis in sociology.

The respondents in this study were chosen at random from among all KSU Agricultural Experiment Station project leaders. You are not obligated to answer any of the questions included in the interview schedule. If at any time you wish to terminate the interview you are free to do so. Strict anonymity will be preserved and your name will not be used at any time in the data analysis or write-up. If you have any questions, please feel free to ask them now or at the end of the interview.

I have read the above statement and have been advised of the procedures to be used in this project. I hereby voluntarily agree to participate in this project.

DATE

INTERVIEWEE

APPENDIX D

LOCATION OF EXPERIMENT STATION AND BRANCH STATIONS

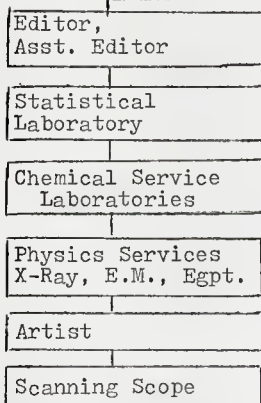
APPENDIX E
ORGANIZATIONAL CHART OF KANSAS STATE UNIVERSITY

APPENDIX F

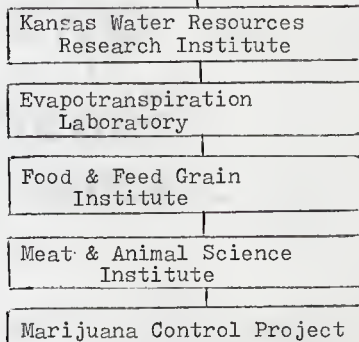
ORGANIZATIONAL CHART OF KANSAS STATE AGRICULTURAL
EXPERIMENT STATION

Agricultural Experiment Station
(Director, Asst. Director,
Adm. Asst.)
Home Economics - Assoc. Director

General Service Functions



Special Agencies

DEPARTMENTSAgricultureCentral Station

Agricultural Economics
Agronomy
Animal Science & Industry
Biochemistry
Dairy & Poultry Science
Entomology
Grain Science & Industry
Horticulture & Forestry
Plant Pathology
Agricultural Engineering

Home Economics (College)

Veterinary Medicine (College)

Others

(College of Arts & Sciences)
Biology
Chemistry
Economics
Geology
Physics
Statistics & Computer Science
Political Science
Sociology & Anthropology
(College of Engineering)
Chemical Engg.
Nuclear Engg.
College of Business Admin.
Counseling Center

Branch Stations

Fort Hays, Colby, Garden City, Tribune, S.E. Kansas

Outlying Fields

Agronomy (6+3); Agr. Engineering (1+2); Horticulture &
Forestry - 3

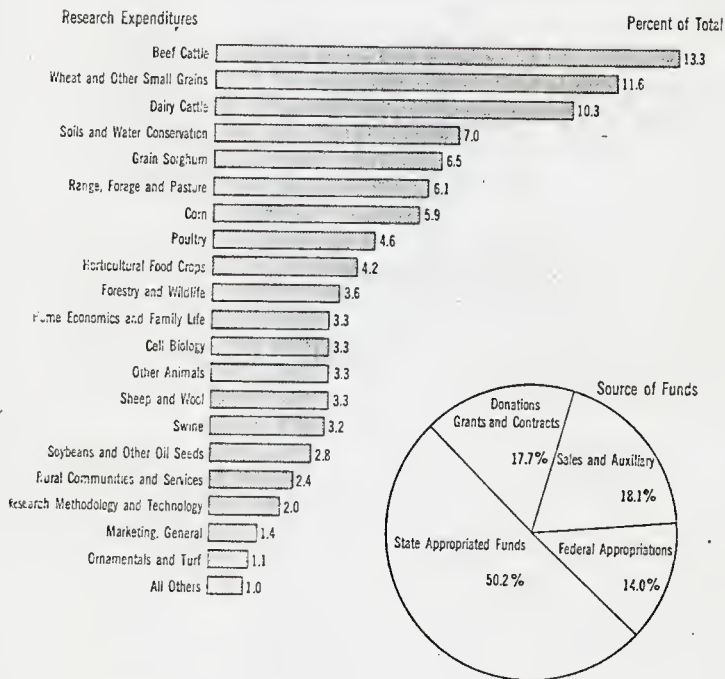
Table 8

Source: Minutes Station Conference 1970. Kansas Agricultural Experiment Station, Manhattan, Kansas, Floyd W. Smith, Director. January 26-28, 1970.

APPENDIX G
FINANCIAL REPORT AND RESEARCH EXPENDITURES

FINANCIAL REPORT

Kansas Agricultural Experiment Station



Cattle Feeders' Day, 1976-77

(Report of Progress 288, May 6, 1977, Garden City Branch Station, Ag. Experiment Station, Kansas State University, Manhattan, Floyd W. Smith, director based on 1975 data).

Kansas State Agricultural Experiment Station

<u>AREA</u>	<u>PERCENT OF TOTAL</u>
<u>Animals and Animal Feed</u>	38
Poultry	4.6
Beef Cattle	13.3
Dairy	10.3
Other Animals	3.3
Sheep	3.3
Swine	3.2
<u>Soil and Water</u>	13.1
Soils	7.0
Range, Forest	6.1
<u>Agricultural Economics and Rural Development</u>	3.8
Rural Marketing	2.4
	1.4
<u>Plant Science</u>	35.7
Grain Sorghum	6.5
Wheat	11.6
Corn	5.9
Horticulture	4.2
Soybeans	2.8
Forestry	3.6
Ornamentals	1.1
<u>Other (basic)</u>	5.3
Research	2.0
Cell Biology	3.3
<u>Home Economics</u>	3.3
Home Economics	3.3

% OF PROJECTS BY FUNDING SOURCE



Taken from data in Cattle Feeders' Day, 1976-77, Report of Progress 288, May 6, 1977, Garden City Branch Station, Ag. Experiment Station, Kansas State University, Manhattan, Floyd W. Smith, director.

APPENDIX H
DEFINITION OF TERMS

Agribusiness. A corporate aggregation that includes (any of the four): (1) agricultural input firms; (2) agricultural output firms, (3) corporations directly involved in farming; and (4) corporations indirectly involved in farming.

Agricultural input industry. An aggregation of firms that supply seed, feed, farm machinery, fertilizer, fuels, chemicals, credit, insurance, and other factors of agricultural production.

Agricultural output industry. An aggregation of corporate middlemen between the farmer and the consumer, including firms that pack process, can, package, distribute, market, advertise, retain, and otherwise handle food and fiber after it leaves the farm.

Agricultural Research Service (ARS). USDA's research agency, conducting agricultural research at the federal level, based on USDA's perception of national and regional research needs. They have scientists at Kansas State University.

Cooperative State Research Service (CSRS). The USDA agency that administers federal research money allocated to state agricultural experiment stations by statutory formula. In addition, CSRS administers a relatively small amount of nonformula funds, expended through research contracts made with the stations.

Extension Service (ES). The Extension Service includes the national network of extension agents and administrators. The Federal Extension Service (FES) is the USDA

agency that administers national funds for extension work. The Cooperative Extension Service (CES) is the usual designation of any state extension service.

Family farm. A farm that is controlled and worked by the family that lives on the farm. Financial risk, managerial decisions, and work on the farm are direct responsibilities of the family, which exercises full, entrepreneurial authority.

Land grant college community. Includes people directly involved in the land grant college complex at the campus level, in county extension offices, in government, and in agribusiness. This is a community of shared interests, involving teachers, researchers, administrators, students, governmental officials relating to the complex, and agribusiness organizations with a proprietary interest in the work of the complex. Many citizens of the state also feel that they are members of the community, particularly those who use branch stations and county agents, and those who come to campus.

Land grant college complex. The agricultural component of the land grant university system. The complex includes colleges of agriculture, agricultural experiment stations, and extension services. Engaged in teaching, research, and dissemination of knowledge in all fifty states, the complex accounts for an annual public expenditure approaching \$750 million. Besides the College of Agriculture, Home Economics, Veterinary Medicine, Agricultural Engineering and other

related fields are included.

Land grant college system. The higher educational system created under the Morrill land grant act. It is composed of sixty-nine land grant-universities and teaches everything from nuclear physics to Chaucer with an emphasis on agriculture. Included in this extensive educational system are agricultural experiment stations and county extension services.

National Association of State Universities and Land Grant Colleges (NASULGC). A Washington-based organization representing 118 public institutions of higher education, including all sixty-nine land grant colleges. NASULGC's Division of Agriculture represents agricultural college deans, heads of agricultural experiment stations, and deans of extension. The division is operated by and for the land grant complex. The NASULGC division is a powerful spokesman for the complex and is directly involved in the development of agricultural research priorities for the country.

Research Problem Areas (RPA). A series of USDA classifications for agricultural research projects. Allocations of money and scientific man-years are allotted under these RPA's.

State Agricultural Experiment Station (SAES). The agricultural, home economics, veterinary medicine, and agricultural engineering component of each land grant college.

Scientific man-years (SMY). A measurement of scientific, technical, and other time expended on research projects. The measurement is based on a standardized formula,

and allocations of SMY are reported through CRIS. A man-year is equivalent to one full-time scientist. Many scientists are a fraction teaching and a fraction research time.

United States Department of Agriculture (USDA). The department with primary federal responsibility for overseeing use of federal funds allotted to the land grant college complex.

Vertical integration. The movement of agricultural input and output firms into the production stage of food and fiber. The movement can be direct, as when a processing plant buys or leases land to produce commodities for its processing operation. It can be indirect, as when an agribusiness firm contracts with a farmer to produce a certain quantity and quality of a certain commodity at a certain time and for a certain price. In both cases, a degree of control over food and fiber production passes from farmers to agribusiness corporations. (Hightower in Merrill, 1976:108-110).

Organic farmers. Farmers who use no chemical pesticides, insecticides, or fertilizers but rather use biological means of insect and weed control and enrich the fertility of the soil by adding organic fertilizers that increase the humus content.

Rural area or community. According to the definition of the Census Bureau, a community or area with a population of fewer than 2,500.

APPENDIX I

LAWS PERTAINING TO THE LAND GRANT COMPLEX

12 Stat. 387, May 15, 1862

"An act to establish a Department of Agriculture. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That there is hereby established at the seat of Government of the United States a Department of Agriculture, the general designs and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word, and to procure, propagate, and distribute among the people new and valuable seeds and plants."

7 USC 5 301 - - 1970 (amended)

"Land Grant aid of colleges. There is granted to the several States, . . . an amount of public land, to be apportioned to each State a quantity equal to 30 thousand acres for each Senator and Representative in Congress to which the States are respectively entitled by the appointment under the census of 1860: Provided, That no mineral lands be selected or purchased under the provisions of said sections.

Morrill Act of 1862 - - 12 Stat. 503, July 2, 1862

"An act donating Public Lands to the Several States and Territories which may provide Colleges for the Benefit of Agriculture and the Mechanic Arts." That money from the sale of such land, interest or invested "shall constitute a perpetual fund, the capital of which shall remain forever undiminished . . . and the interest of which shall be inviolably appropriated, by each state which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and the mechanic arts, in manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life."

Hatch Act - - 24 Stat. 440, March 2, 1887

"An Act to establish agriculture experiment stations in connection with the colleges established in several States under the provisions of an act approved July second, eighteen hundred and sixty-two, and of the acts supplementary thereto."

Section 2 of Hatch Act - - 24 Stat. 440, March 2, 1887

"That it shall be the object & duty of said experiment stations to conduct original researchers or verify experiments on the physiology of plants & animals: . . . the comparative advantages of rotative cropping as pursued under a varying series of crops: the capacity of new plants or trees for acclimation the analysis of soils & water: the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds: . . . and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable . . ."

Morrill Act of 1890 - - 26 Stat. 417-418

"An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July 2, eighteen hundred and sixty-two." (417)
 ". . . That no money shall be paid out under this act to any State or Territory for the support and maintenance of a college where a distinction of race or color is made in the admission of students, but the establishment and maintenance of such colleges separately for white and colored students shall be held to be a compliance with the provisions of this act if the funds received in such State or Territory be equitably divided as hereinafter set forth." (418)

Adams Act of 1906 - - 34 Stat. 63

"An Act To provide for an annual increased appropriation for agriculture experiment stations and regulating the expenditures thereof."

34 Stat. 692-693 - - 1906

"Agricultural Experiment Stations: To carry into effect the provisions of an Act approved March second, eighteen hundred and eighty-seven, entitled "An Act to establish agricultural experiment in connection with the colleges established in the several states under the provision of an Act approved July second, eighteen hundred and sixty-two, and of the Acts supplementary thereto . . ."

Smith-Lever Act of 1914 - - 38 Stat. 372

"An Act to provide for cooperative agricultural extension work between the agricultural colleges in the several States receiving the benefits of an Act of Congress approved

July second, eighteen hundred and sixty-two, and of Acts supplementary thereto, and the United States Department of Agriculture."

Smith-Hughes Act of 1917 - - 39 Stat. 929

"An Act To provide for the promotion of vocational education; to provide for cooperation with the States in the ptomotion of such education in agriculture and the trades and industries; to provide for cooperation with the States in the preparation of teachers of vocational subjects; and to appropriate money and regulate its expenditure."

Purnell Act of 1925 - - 43 Stat. 970

"An Act To authorize the more complete endowment of agricultural experiment stations, and for other purposes."

Bankhead Jones Act of 1935 - - 49 Stat. 436

"To provide for research into basic laws and principles relating to agriculture and to provide for the further development of cooperative agricultural extension work and the more complete endowment and support of land-grant colleges."

Amendment of the Agricultural Marketing Act of 1946 -- 60 Stat. 1083

"To provide for further research into basic laws and principles relating to agriculture and to improve and facilitate the marketing and distribution of agricultural products."

Consolidated Hatch Act of 1955 - - 69 Stat. 671

"To consolidate the Hatch Act of 1887 and laws supplementary thereto relating to the appropriation of Federal funds for the support of agricultural experiment stations in the States, Alaska, Hawaii, and Puerto Rico (a territory)."

7 USC 341 - - 1964

"Cooperative extension work by colleges. In order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same, there may be continued or inaugurated in connection with the college or colleges in each State, Territory, or possession,

now receiving, or which may hereafter receive, the benefits (designated to them), agricultural extension work which shall be carried on in cooperation with the United States Department of Agriculture"

McIntire-Stennis Act of 1962 - - 76 Stat. 806

"To authorize the Secretary of Agriculture to encourage and assist the several States in carrying on a program of forestry research, and for other purposes."

7 USC 342 - - 1970 (amended)

"Cooperative agricultural extension work: cooperation with Secretary of Agriculture. Cooperative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics and subjects relating thereto to persons not attending or resident in said colleges in the several communities, and imparting information on said subjects through demonstrations, publications, and otherwise and for the necessary printing and distribution of information in connection with the foregoing"

7 USC 347a - - 1970 (amended)

"Disadvantaged agricultural areas.

(a) Congressional findings.

The Congress finds that there exists special circumstances in certain agricultural areas which cause such areas to be at a disadvantage insofar as agricultural development is concerned, which circumstances include the following:

- (1) There is concentration of farm families on farms either too small or too unproductive or both;
- (2) such farm operators because of limited productivity are unable to make adjustments and investments required to establish profitable operations;
- (3) the productive capacity of the existing farm unit does not permit profitable employment of available labor;
- (4) because of limited resources, many of these farm families are not able to make full use of current extension programs designed for families operating economic units nor are extension facilities adequate to provide the assistance needed to produce desirable results.

(c) Assistance.

In determining that the area has such special need, the Secretary shall find that it has a substantial number of disadvantaged farms or farm families for one or more of the reasons heretofore enumerated. The Secretary shall make provisions for the assistance to be extended to include one or more of the following" (1) Intensive on-the-farm educational assistance to the farm family in appraising and resolving its

problems; (2) assistance and counseling to local groups in appraising resources for capability of improvement in agriculture or introduction of industry designed to supplement farm income; (3) cooperation with other agencies and groups in furnishing all possible information as to existing employment opportunities particularly to farm families having under-employed workers; and (4) in cases where the farm family, after analysis of its opportunities and existing resources, finds it advisable to seek a new farming venture, the providing of information, advice, and counsel in connection with making such change."

7 USC 361b - - 1970 (amended)

"To promote the efficient production, marketing, distribution, & utilization of the products of the farm as essential to the health and welfare of our peoples and to promote a sound and prosperous agriculture and rural life as indispensable to the maintenance of maximum employment and national prosperity and security."

7 USC 390 - - 1970

"Congressional declaration of policy.
It is hereby declared to be the policy of the Congress to continue its support of agricultural research at the State agricultural experiment stations through Federal-grant funds, on a matching basis, to help finance physical facilities as required for the effective conduct of an adequate research program."

ANALYSIS OF FACTORS INFLUENCING
SELECTION OF RESEARCH TOPICS IN THE
KANSAS STATE AGRICULTURAL EXPERIMENT STATION

by

KAREN SCHWARTZ

B.A., Kansas State University, 1973

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the
requirements for the degree

MASTER OF ARTS

Department of Sociology, Anthropology, and Social Work

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1978

This study involves an analysis of the Kansas State Agricultural Experiment Station and the factors influencing selection of research topics. In developing a framework for the analysis of the Experiment Station, the open systems model was used as it emphasized the interaction between an organization and its environment. As experiment stations cannot be examined in isolation the following issues were included:

(a) the historical background of the land grant system, specifically the identification of prime beneficiaries;

(b) how researchers perceive their role within the experiment station and the extent to which researchers perceive that they are allowed to select research topics they will conduct; and

(c) the pressures experiment stations face from funding groups and critics, how experiment stations cope with those pressures, and the extent those pressures influence the research that is conducted.

First, the historical background of the land grant system was analyzed. The Morrill Act of 1862 established the land grant colleges as part of the land grant system. Among the factors influencing the development of the land grant system was the desire to provide a school for educating farmers and laborers. Agrarianism was strong throughout the late 1800's. While radical agrarians attempted to improve the farmer's economic situation through political means,

conservative agrarians sought improvements through technology. Thus, the conservative agrarians looked to the land grant system with its emphasis on productivity and technology for assistance.

Another element in the analysis of agricultural experiment stations was the socialization of researchers. It was argued that agricultural researchers have similar educational and occupational backgrounds and have been integrated into a social and political system that shapes their research values and goals.

The next section discussed the outside pressures and counterpressures experienced by experiment stations. Funding agencies or those with the power to influence funding agencies have the ability to exert pressure on an experiment station. Counterpressures are responses that are critical of experiment stations by farmers, consumers, or others.

To examine the socialization of researchers and the influence of the source and amount of funds and the length of the project, 53 researchers in the Kansas State Agricultural Experiment Station were interviewed. Among the questions asked were the following: who selected a specific research topic, what were the priority areas of the administration and researcher, who benefits from research, and how much pressure was experienced by researchers.

It was found that researchers were generally allowed to develop the research topic they conducted. While the source of funds did not stipulate the project topic, the

source and amount of funds and the length of the project were influences on other research factors. For instance, private funded projects had lower funds than state or federal. Long-term projects were more often priorities of the administration than short-term. Finally, the higher the average annual funds, the more likely the project was a primary area of the researcher.

In conclusion, while researchers generally expressed freedom in the selection of research topics, funding and the length of the project influenced research. The analysis of researcher perceptions of agricultural experiment stations is only one element in the study of the land grant system. Further research areas include the dissemination of research by the Extension Service, the role of the land grant administration in the functioning of universities, and the influence of outside organizations or individuals on research.